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(54)【発明の名称】　複合化不織布及びそれを用いた吸収性物品

(57)【要約】

【課題】　嵩高で、風合い及び感触が良好で、かつ尿等の透過性の良さ、スポット透過性、サラット感、及び逆戻り性の低さに優れた複合化不織布及びそれを用いた吸収性物品を提供すること。

【解決手段】　繊維長３８～９０ｍｍの短繊維不織布（Ａ）と繊維長３～３０ｍｍの短繊維不織布（Ｂ）が接合された少なくとも２層の複合化不織布であって、前記短繊維不織布（Ｂ）は、少なくとも２種の高融点成分と低融点成分との熱可塑性樹脂からなる熱融着性複合短繊維であり、かつ、該熱融着性複合短繊維同士は熱融着され、形成される短繊維接点の交差角分布が短繊維不織布（Ｂ）の総接点数の少なくとも５０％を交差角６０～９０°で占めていることを特徴とする複合化不織布による。

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【特許請求の範囲】

【請求項１】　繊維長３８～９０ｍｍの短繊維不織布（Ａ）と繊維長３～３０ｍｍの短繊維不織布（Ｂ）が接合された少なくとも２層の複合化不織布であって、前記短繊維不織布（Ｂ）は、少なくとも２種の高融点成分と低融点成分との熱可塑性樹脂からなる熱融着性複合短繊維であり、かつ、該熱融着性複合短繊維同士は熱融着され、形成される短繊維接点の交差角分布が短繊維不織布（Ｂ）の総接点数の少なくとも５０％を交差角６０～９０°で占めていることを特徴とする複合化不織布。

【請求項２】　短繊維不織布（Ａ）が、少なくとも２種の高融点成分と低融点成分との熱可塑性樹脂からなる熱融着性複合繊維（Ｃ）と親水性繊維（Ｄ）からなり、かつ、親水性繊維の混合比率が、７０重量%以下である請求項１に記載の複合化不織布。

【請求項３】　短繊維不織布（Ａ）を構成する繊維同士が接触あるいは接合されて形成される接点の交差角分布において、不織布（Ａ）の総接点数の少なくとも５０％が交差角０～３０°である請求項１または２に記載の複合化不織布。

【請求項４】　短繊維不織布（Ａ）が、厚み方向に密度勾配を有する請求項１～３の何れかに記載の複合化不織布。

【請求項５】　短繊維不織布（Ｂ）が、厚み方向に密度勾配を有する請求項１～４の何れかに記載の複合化不織布。

【請求項６】　短繊維不織布（Ａ）が、該不織布に含まれる熱融着性複合繊維の低融点成分の融点以上、高融点成分の融点以下で熱処理された請求項１から５の何れかに記載の複合化不織布。

【請求項７】　少なくとも２種の高融点成分と低融点成分との熱可塑性樹脂からなる熱融着性複合短繊維ウェッブを、エアレイド法により開繊飛散させながら、短繊維不織布（Ａ）上に堆積した後、堆積された短繊維ウェッブに含まれる熱可塑性樹脂の低融点成分の融点以上、高融点成分の融点以下で熱処理して短繊維不織布（Ｂ）を形成することを特徴とする複合化不織布の製造法。

【請求項８】　請求項１～６のいずれかに記載の複合化不織布を表面材のトップシート及びセカンドシートのうち１種以上を用いた吸収性物品。

【発明の詳細な説明】

【００１０】

【発明の属する技術分野】本発明は、嵩高で、風合い及び感触の良好な複合化不織布及びその製造法、それを用いた吸収性物品に関する。さらに詳しくは、使い捨ておむつや生理用ナプキン等の吸収性物品、手術用着衣、掛け布、ハップ材の基布等の他、フィルター材、土木資材等にも好適に使用でき、特に使い捨ておむつや生理用ナプキン等の吸収性物品のトップシートに要求される体液の透過性、スポット透過性、サラット感、また透過した体液の逆戻り性の低さに優れる複合化不織布及びその製造法、さらには本発明の複合化不織布を用いた吸収性物品に関するものである。

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【００１１】

【従来の技術】カード法に代表される手法で得られる短繊維不織布は、均質性に優れ、捲縮を有する短繊維によって構成されることから、嵩高で肌触り等の感触が良好なものである。しかしながら、カード法を使用して得られる短繊維不織布は、不織布を構成している短繊維が不織布の長手方向すなわち機械方向（不織布の生産方向）に配列し極めてランダム性に劣っている。このため、機械方向の引っ張り強度が強く、吸収性物品の加工特性（高速生産性）に優れるが、吸収性物品の表面材、特にトップシートに用いた場合、この短繊維不織布は、不織布の機械方向に毛細管的な作用が働き、体液の透過時に体液が繊維の配列方向に広がり易く、透過性に劣るばかりか、保液しやすいという欠点があった。

【００１２】一方、カード法よりも比較的繊維長の短い繊維を扱うウェッブ形成法としては、抄紙法やエアレイド法が知られている。いずれの方法も、水もしくは空気といった媒体中に短繊維を分散させた後に吸引集積し、ウェッブを形成する。このため、この両手法による不織布は繊維の配列方向がランダムであり、吸収性物品の表面材、特にトップシートに用いた場合、スポット透過性に優れる。しかしながら、無捲縮の繊維を抄紙法で加工した不織布は、比較的高強度ではあるものの、極端に嵩高性が劣っており、吸収性物品の表面材として用いた場合、透過性に劣り、保液しやすいばかりか、肌触り等の感触が悪いという欠点があった。この不織布の透過性及び感触が悪く保液しやすく、肌触り等の感触が悪い理由は、構成繊維の短繊維に捲縮が発現しておらず、見かけ密度が高く含有空気量が少ないためである。従って、捲縮を有した短繊維を用いれば感触の良好な短繊維不織布が得られると考えられる。しかし、捲縮を有した繊維をこの方法で加工した不織布は、嵩高性は改善され、体液の透過性、スポット透過性、サラット感、また透過した体液の逆戻り性の低さには優れるものの、繊維の配列がランダムなため、カード基を通過させることにより繊維が配向した不織布と比較して、機械方向の強度が比較的小さく、破れやすいがために吸収性物品の加工特性（高速生産性）に劣るという欠点があった。また、エアレイド法による不織布は、一般的に抄紙法で得られる不織布よりも嵩高であり、吸収性物品の表面材、特にトップシートに用いた場合、体液の透過性、スポット透過性、サラット感、また透過した体液の逆戻り性の低さに優れるが、捲縮繊維を抄紙法に用いた場合同様の理由で機械方向の強度が比較的小さく、破れやすいがために吸収性物品の加工特性（高速生産性）に劣るという欠点があった。

【００１３】このようにいずれの短繊維不織布ともに長

所と短所があり、これら長所を単一層において両立させることは難しかった。これら短繊維不織布の長所を両立させる類似の技術には、例えば特開昭５８－１８０６５１号公報に、ランダムカード機等による短繊維不織布と通常のカード機による短繊維不織布を積層した不織布が開示されている。しかしながら、この技術に記載のランダムカード機による短繊維不織布は、多少のランダム性は付与されるものの、所詮カード法を使用して得られるため、カード機の針で繊維が梳かれて開繊される際に繊維間の摩擦によって生じる短繊維相互間の交差角は鋭角を形成しやすく、加えて不織布を構成している短繊維が不織布の長手方向すなわち機械方向に配向しているためランダム性に劣っている。このため、吸収性物品の表面材として用いた場合、この短繊維不織布及びこの積層不織布は、不織布の機械方向に毛細管的な作用が働き、体液の透過時に体液が繊維の配列方向に広がり易いために、透過性に劣るばかりか、保液しやすく、スポット透過性に乏しく、逆戻りし易いということがあった。すなわち、この技術に係わる積層不織布は、使い捨ておむつや生理用ナプキン等の吸収性物品の表面材として固有の特性である尿、汗、血液等の体液の透過性の良さ、スポット透過性、サラット感、また透過した体液の逆戻り性の低さについては満足のできるものではなかった。

【００１４】

【発明が解決しようとする課題】本発明の第１の目的は、嵩高で風合い及び感触の良好な複合化不織布を提供することであり、第２の目的は、特に要求性能の厳しい吸収性物品の表面材、特にトップシート或いはセカンドシートなどの体液が透過する部材に使用した場合、尿、汗、血液等の体液の透過性、スポット透過性、肌触り感を向上させ、かつ逆戻り性の低い複合化不織布及びその製造法を提供することにある。本発明者らは、上記課題を解決すべく鋭意研究を重ねた結果、カード法による短繊維不織布とある特定の短繊維不織布とを複合化することにより、複合化不織布の見かけ密度を十分に低下させ、引張強度が高く且つ肌触り良好で、さらに使い捨ておむつや生理用ナプキン等の吸収性物品の表面材に要求される体液の透過性及びスポット透過性に優れ、かつ逆戻り性の低い複合化不織布が提供できることを知り、本発明を完成するに至った。

【００１５】

【課題を解決するための手段】

（１）　繊維長３８～９０ｍｍの短繊維不織布（Ａ）と繊維長３～３０ｍｍの短繊維不織布（Ｂ）が接合された少なくとも２層の複合化不織布であって、前記短繊維不織布（Ｂ）は、少なくとも２種の高融点成分と低融点成分との熱可塑性樹脂からなる熱融着性複合短繊維であり、かつ、該熱融着性複合短繊維同士は熱融着され、形成される短繊維接点の交差角分布が短繊維不織布（Ｂ）の総接点数の少なくとも５０％を交差角６０～９０°で占めていることを特徴とする複合化不織布。

（２）　短繊維不織布（Ａ）が、少なくとも２種の高融点成分と低融点成分との熱可塑性樹脂からなる熱融着性複合繊維（Ｃ）と親水性繊維（Ｄ）からなり、かつ、親水性繊維の混合比率が、７０重量％以下である（１）項に記載の複合化不織布。

（３）　短繊維不織布（Ａ）を構成する繊維同士が接触あるいは接合されて形成される接点の交差角分布において、不織布（Ａ）の総接点数の少なくとも５０％が交差角０～３０°である（１）または（２）項に記載の複合化不織布。

（４）　短繊維不織布（Ａ）が、厚み方向に密度勾配を有する（１）～（３）項の何れかに記載の複合化不織布。

（５）　短繊維不織布（Ｂ）が、厚み方向に密度勾配を有する（１）～（４）項の何れかに記載の複合化不織布。

（６）　短繊維不織布（Ａ）が、該不織布に含まれる熱融着性複合繊維の低融点成分の融点以上、高融点成分の融点以下で熱処理された（１）から（５）項の何れかに記載の複合化不織布。

（７）　少なくとも２種の高融点成分と低融点成分との熱可塑性樹脂からなる熱融着性複合短繊維ウェッブを、エアレイド法により開繊飛散させながら短繊維不織布（Ａ）上に堆積した後、堆積された短繊維ウェッブに含まれる熱可塑性樹脂の低融点成分の融点以上、高融点成分の融点以下で熱処理して短繊維不織布（Ｂ）を形成することを特徴とする複合化不織布の製造法。

（８）　（１）～（６）項のいずれかに記載の複合化不織布を表面材のトップシート及びセカンドシートのうち１種以上を用いた吸収性物品。

【００１６】

【発明の実施の形態】本発明は上記構成をとることにより、単独として用いた場合の短繊維不織布（Ａ）及び（Ｂ）の弱点を、複合化不織布にすることで克服し、両者のメリットを最大限に引き出している点にその特徴がある。すなわち、短繊維不織布（Ｂ）の機械方向の引っ張り強度の低さを短繊維不織布（Ａ）が実質的に補強し、短繊維（Ａ）が不織布の長手方向すなわち機械方向に配列しているために生じる、短繊維不織布（Ａ）のスポット透過性の悪さを、短繊維不織布（Ｂ）の優れた体液透過性能が複合化不織布の体液透過性、スポット透過性及びサラット感を向上させ、かつ透過した体液の逆戻りを防止していることである。以下本発明を詳細に説明する。本発明に係る複合化不織布は、繊維長３８～９０ｍｍの短繊維不織布（Ａ）と繊維長３～３０の短繊維不織布（Ｂ）で構成されるものである。以下、短繊維不織布（Ａ）を構成する短繊維層を短繊維層（Ａ）或いは短繊維ウェッブ（Ａ）、さらにこれらを構成する短繊維を短繊維（Ａ）とし、短繊維不織布（Ｂ）の場合も同様と

する。

【００１７】本発明でいう短繊維不織布（Ａ）とは、短繊維（Ａ）が集積接合されてなるもので、従来公知のカード機、例えばパラレルカード機、ランダムカード機、ランダムウェッパー等を用いて得ることができる。短繊維不織布（Ａ）を構成する短繊維の繊度は、用途により微細繊度（０．５～２ｄ／ｆ）、細繊度（２～１２ｄ／ｆ）、中繊度（１２～５０ｄ／ｆ）、太繊度（５０～１０００ｄ／ｆ）等、種々の使用ができる。特に吸収性物品の表面材に使用する場合において、短繊維（Ａ）の繊度は０．５～１２ｄが好ましい。短繊維（Ａ）の繊度が０．５ｄ／ｆ未満になると、短繊維（Ａ）が開繊される際に、開繊機の針が通り難くなり、いわゆるネップが存在する不均質な短繊維不織布しか得られないので好ましくない。逆に短繊維（Ａ）の繊度が１２ｄ／ｆを超えると、短繊維（Ａ）の剛性が高くなって、柔軟性に富む短繊維不織布（Ａ）が得られないので好ましくない。特に、吸収性物品の表面材に使用する場合において、繊度は０．５～６ｄ／ｆのものが最も好ましい。その他、手術用着衣、掛け布、ハップ材の基布等には細繊度（２～１２ｄ／ｆ）、土木資材等には中繊度（１２～５０ｄ／ｆ）～太繊度（５０～１０００ｄ／ｆ）の広範囲の適用が図れる。

【００１８】短繊維不織布（Ａ）の目付けは、使われる用途によって任意であるが、手術用着衣、掛け布、ハップ材の基布等に使用する場合において、５～１５０ｇ／㎡が好ましい。短繊維不織布（Ａ）の目付けが、５ｇ／㎡未満になると、短繊維不織布（Ａ）の厚みが薄くなりすぎて、短繊維ウェップ（Ａ）を固定化させる際や、固定化された短繊維不織布（Ａ）を巻き取る際、短繊維（Ｂ）を堆積もしくは短繊維不織布（Ｂ）と積層させる際等において、取扱いが困難であったり、均質性が低下するので好ましくない。逆に、１５０ｇ／㎡を超えると短繊維不織布自体の剛性が高くなり、柔軟性が低下するので好ましくない。特に、吸収性物品の表面材に使用する場合において、短繊維不織布（Ａ）の目付けは、５～５０ｇ／㎡が好ましい。さらに、短繊維（Ａ）は、カード機によって梳かれて開繊するための捲縮が付与されたものを使用する。捲縮形状としては螺旋型、ジグザグ型、Ｕ字型等が例示され、とりわけ、嵩高性が良好な点において、螺旋型とＵ字型が好ましい。

【００１９】短繊維不織布（Ａ）を構成している短繊維（Ａ）としては、熱可塑性樹脂若しくは非熱可塑性樹脂より成る合成繊維、半合成繊維、天然繊維、無機繊維等が使用できる。短繊維（Ａ）が熱可塑性樹脂以外の原料を使用した場合、短繊維（Ａ）は、短繊維ウェップ（Ａ）を固定化する際等において加工のバラエティーが広がる点から、溶剤に可溶性のものが好ましい。短繊維が熱可塑性の場合、短繊維（Ａ）は、１成分よりなる繊維であっても良いし、２成分以上、例えば、３若しくは４成分から成る複合繊維であっても良い。しかし、経済性を考慮すれば、特殊な用途を除いて２成分で十分である。ここで短繊維（Ａ）の原料となる熱可塑性樹脂は、各種のポリエチレン、ポリプロピレン等のポリオレフィン系、ポリエステル系、ポリアミド系、ポリウレタン系等を例示でき、とりわけ好ましくはポリオレフィン系である。複合短繊維としては、非熱融着性複合繊維であっても良いし、熱融着性複合繊維であっても良いが、短繊維不織布（Ａ）の短繊維同士の接点接着固定の効果や、後工程の短繊維不織布（Ｂ）との複合化における接合の効果を考慮したとき熱融着性複合繊維を含むことが好ましい。熱融着性複合短繊維とは、繊維表面の少なくとも一部に、低融点成分が形成される２成分系以上の複合短繊維である。

【００２０】熱融着性複合短繊維の組み合わせの例として、高密度ポリエチレン／ポリプロピレン、直鎖状低密度ポリエチレン／ポリプロピレン、低密度ポリエチレン／ポリプロピレン、プロピレンと他のα－オレフィンとの二元共重合体または三元共重合体／ポリプロピレン、直鎖状低密度ポリエチレン／高密度ポリエチレン、低密度ポリエチレン／高密度ポリエチレン、各種のポリエチレン／熱可塑性ポリエステル、ポリプロピレン／熱可塑性ポリエステル、プロピレンと他のα－オレフィンとの二元共重合体または三元共重合体／熱可塑性ポリエステル、低融点熱可塑性ポリエステル／熱可塑性ポリエステル、各種のポリエチレン／ナイロン６、ポリプロピレン／ナイロン６、プロピレンと他のα－オレフィンとの二元共重合体または三元共重合体／ナイロン６、ナイロン６／ナイロン６６、ナイロン６／熱可塑性ポリエステルなどを挙げることができる。

【００２１】これらの中ではポリオレフィン系同士若しくはポリオレフィン系とポリエステル系からなる組み合わせが好ましく、その具体例としては高密度ポリエチレン／ポリプロピレンまたはエチレン・プロピレン・ブテン－１結晶性三元共重合体／ポリプロピレンあるいは高密度ポリエチレン／ポリエチレンテレフタレート等を挙げることができる。さらに、これらの中ではポリオレフィン系同士、例えば高密度ポリエチレン／ポリプロピレン、エチレン・プロピレン・ブテン－１結晶性三元共重合体／ポリプロピレン等が耐薬品性の面から特に好ましい。

【００２２】該複合成分の高融点成分と低融点成分との融点差または軟化点差は、１５℃以上が好ましい。例えば、熱融着性複合短繊維が、Ａ，Ｂ，Ｃ３種の熱可塑性樹脂で構成され、この融点または軟化点がＡ＞Ｂ＞Ｃの場合、ＡＢ間及びＢＣ間の少なくとも一方の融点差または軟化点差は、１５℃以上が好ましい。すなわち、熱融着性複合短繊維を構成する熱可塑性樹脂を融点の高い順または低い順に並べた時、隣合う成分の融点差または軟化点差の少なくとも１つが、１５℃以上であることが好

ましい。また、熱融着性複合短繊維を構成する３種の熱可塑性樹脂Ａ，Ｂ，Ｃの融点または軟化点がＡ＞Ｂ＞Ｃであって、ＡＢ間にのみ１５℃以上の融点差または軟化点差がある場合は、Ａが高融点成分、Ｂ，Ｃが低融点成分と定義される。さらに、熱融着性複合短繊維を構成する３種の熱可塑性樹脂Ａ，Ｂ，Ｃの融点または軟化点がＡ＞Ｂ＞Ｃであって、ＡＢ間及びＢＣ間共に１５℃以上の融点差または軟化点差がある場合は、Ａが高融点成分、Ｃが低融点成分と定義され、複合短繊維が熱融着複合短繊維であるという条件を満たした上で、Ｂは高融点成分及び低融点成分のどちらで扱われても差し支えない。すなわち、熱融着性複合短繊維が３種以上の熱可塑性樹脂で構成する場合、熱融着性複合短繊維を構成する熱可塑性樹脂を融点の高い順または低い順に並べた時の隣合う成分の融点差または軟化点差が１５℃以上の間を境に、低融点成分と高融点成分が定義される。さらにこの間が複数存在する場合は、低融点成分が繊維表面の少なくとも一部に形成されるという条件を満たした上で、低融点成分と高融点成分は、任意の間を境に定義してかまわない。

【００２３】更に、非熱可塑性の樹脂より成る合成繊維、半合成繊維、天然繊維、無機繊維としてはフェノール系樹脂による繊維、レーヨン、キュプラ、アセテート、炭素繊維、ガラスファイバーなどを例示することができる。また該複合短繊維は、鞘芯型、偏心鞘芯型、並列型、多層型、海島型の複合繊維が使用できる。また用途により短繊維は、着色剤、耐光剤、難燃剤、抗菌剤などが添加されていても良い。さらに、短繊維の断面は、円形であっても異形であっても良く、これら断面を持った短繊維は、中空型であってもそうでなくても良い。短繊維不織布（Ａ）は、２種以上の短繊維（Ａ）で構成されていても良い。すなわち、短繊維不織布（Ａ）は、複合型または単一型、複合型の場合は樹脂の組み合わせの異なるもの、さらに複合型の場合は熱融着性または熱融着性でないもの、単一型の場合は樹脂のことなるもの、断面形状の異なるもの、中空型またはそうでないもの、繊度の異なるものの各種組合せによる２種以上の短繊維（Ａ）の混綿によって構成されていても良い。また、短繊維不織布（Ａ）は、上記短繊維から構成される単層であっても良いし、２層以上であっても良い。複合化不織布を体液が透過する部材に用いる場合、複合化不織布は親水性でなければならない。複合化不織布を親水化するために、短繊維（Ａ）、（Ｂ）は、その表面に界面活性剤等の親水化剤を塗布または付着させ親水性に処理することができる。特に、短繊維（Ａ）、（Ｂ）が熱可塑性樹脂で構成される場合、この熱可塑性樹脂に親水化樹脂や界面活性剤等の親水化剤を練り込み、繊維を成形することで、あらかじめ短繊維（Ａ）、（Ｂ）を親水性にすることもできる。また、親水化樹脂や界面活性剤の具体例及び適用方法、適用範囲は、後述する吸収性物品の体液拡散層の場合と同様である。

【００２４】本発明において、特に好ましい短繊維不織布（Ａ）としては、該熱融着性複合短繊維を短繊維不織布中に３０重量%以上含有し、且つこの熱融着性複合短繊維の低融点成分によって短繊維相互間が結合されたものである。また、主たる構成短繊維に、この構成短繊維よりも１５℃以上低融点の熱融着性短繊維を３０重量%以上混繊して、この熱融着短繊維によって主たる構成短繊維を結合した短繊維不織布を使用することもできる。このように、熱融着性複合短繊維や低融点熱融着性短繊維の如く繊維状のもので繊維相互間を結合させる理由は、繊維の結合が、面状でなく接触点でのみ行われ、得られる短繊維不織布（Ａ）の風合いが良好となり、また柔軟性に富むためである。また、短繊維不織布（Ａ）は、前記熱融着性複合短繊維と親水性短繊維の混綿によって構成されても良く、親水性短繊維の混綿率は、短繊維不織布の０～７０重量%、好ましくは０～３０重量%である。この範囲とした理由は、親水性短繊維を混綿することで体液の繰り返し透過性に優れるが、親水性短繊維の混綿率が７０重量%を超えると熱融着性複合短繊維が３０重量%未満となり、熱融着性複合短繊維の融着による短繊維不織布の形態保持が困難になるためである。

【００２５】ここで言う親水性短繊維には、レーヨン、キュプラ、アセテート、ビニロン、ナイロン、蛋白・アクリロニトリル共重合糸、綿、羊毛、絹、麻、パルプ、高分子吸収体（Ｓｕｐｅｒ Ａｂｓｏｒｂｅｎｔ Ｐｏｌｙｍｅｒ）繊維、生分解性繊維等が例示でき、とりわけ好ましくは、レーヨン、キュプラ、アセテート、綿、パルプ等のセルロース系繊維、高分子吸収体繊維及び生分解性繊維である。また、短繊維不織布（Ａ）は、前記熱融着性複合短繊維または前記熱融着性複合短繊維及び親水性短繊維から構成される１層であっても良いし、２層以上であっても良い。短繊維不織布を２層以上にする場合、短繊維不織布（Ａ）は、不織布の厚み方向に密度勾配を付与させたものが好ましい。すなわち、短繊維ウェッブは、密度が次第に増大するように、もしくは密度が次第に減少するように密度勾配を形成させ堆積接合させることが好ましい。また、不織布の厚み方向に親水性繊維の混率に勾配を付与させたものも好ましい。すなわち、短繊維ウェッブは、親水性繊維の混率が次第に増大するように、もしくは次第に減少するように堆積接合させることが好ましい。この様に短繊維不織布（Ａ）に密度勾配もしくは親水性繊維の混率に勾配を付与する理由は、液体の密度が粗な部分から密な部分へ移動する性質もしくは親水性の低いところから高いところへ移動する性質によって体液の透過性が向上し、かつ透過した後の逆戻りを防止し、吸収性物品の表面材等の使用にさらに好適になるためである。

【００２６】以上のような構成を持つ短繊維不織布（Ａ）は、例えば以下のようにして製造されるものであ

る。すなわち、熱融着性短繊維と他の繊維が混合解繊したものを従来公知のカード機に供給し、これより所定の方法によって紡出された均一なウェッブを得る。そして、加熱気体流を充満させた中に導入し、短繊維ウェッブ（Ａ）に含まれる熱融着複合短繊維の低融点成分の融点以上、高融点成分の融点以下で熱処理することで短繊維不織布（Ａ）を得るのである。或いは短繊維ウエッブ（Ａ）に含まれる熱融着性繊維が単一繊維の場合には例えば、凹凸ロールと平滑ロールによって構成されるポイントボンド加工機により、熱圧着することにより短繊維不織布（Ａ）を得ることができる。また、短繊維ウェッブ（Ａ）の固定化（不織布化）としては、上記した例、すなわち熱風加熱法に限らず公知の手法、例えばニードルパンチ法、高圧水流法、エンボスロール法、超音波加熱法等が用いられ、これら手法の組合せであってもかまわない。短繊維ウェッブ（Ａ）固定化（不織布化）の組合せとしては、ニードルパンチ処理とエンボスロール処理、ニードルパンチ処理と超音波加熱処理、ニードルパンチ処理と熱風加熱処理、高圧水流処理とエンボスロール処理、高圧水流処理と超音波加熱処理、高圧水流処理と熱風加熱処理等が例示でき、これら処理は、その順序を問わないが、ニードルパンチ処理は、エンボスロール処理や超音波加熱処理、熱風加熱処理によって形成された熱融着点に対する破壊や切断等の悪影響を避ける点において、先に行われた方が好ましい。

【００２７】一方、短繊維不織布（Ｂ）は、カット長３～３０ｍｍの短繊維（Ｂ）が集積接合されてなるもので、後述するような特定の構成を持つものである。短繊維（Ｂ）の繊度は、用途により微細繊度（０．５～２ｄ／ｆ）、細繊度（２～１２ｄ／ｆ）、中繊度（１２～５０ｄ／ｆ）、太繊度（５０～１０００ｄ／ｆ）等、種々の使用ができる。特に吸収性物品の表面材に使用する場合において、短繊維（Ｂ）の繊度は０．５～１２ｄが好ましい。短繊維（Ｂ）の繊度が０．５ｄ／ｆ未満になると、短繊維（Ｂ）が開繊される際に、開繊機の針が通り難くなり、いわゆるネップが存在する不均質な短繊維不織布（Ｂ）しか得られないので好ましくない。逆に短繊維（Ｂ）の繊度が１２ｄ／ｆを超えると、短繊維（Ｂ）の剛性が高くなって、柔軟性に富む短繊維不織布（Ｂ）が得られないので好ましくない。特に、吸収性物品の表面材に使用する場合において、繊度は０．５～６ｄ／ｆのものが最も好ましい。その他、手術用着衣、掛け布、ハップ材の基布等には細繊度（２～１２ｄ／ｆ）、土木資材等には中繊度（１２～５０ｄ／ｆ）～太繊度（５０～１０００ｄ／ｆ）の広範囲の適用が図れる。

【００２８】また、短繊維不織布（Ｂ）の目付けは、短繊維不織布（Ａ）と同様に、使われる用途によって任意であるが、手術用着衣、掛け布、ハップ材の基布等に使用する場合において、５～１５０ｇ／㎡が好ましい。短繊維不織布（Ｂ）の目付けが、５ｇ／㎡未満になると、短繊維不織布（Ａ）の場合と同様に短繊維不織布（Ｂ）の厚みが薄くなりすぎて、取扱いが困難であったり、均質性が低下するので好ましくない。逆に、１５０ｇ／㎡を超えると短繊維不織布（Ｂ）自体の剛性が高くなり、柔軟性が低下するので好ましくない。特に、吸収性物品の表面材に使用する場合において、短繊維不織布（Ｂ）の目付けは、５～５０ｇ／㎡が好ましい。短繊維（Ｂ）は、繊維長が３～３０ｍｍのものが使用できる。短繊維（Ｂ）の繊維長が３ｍｍ未満になると、短繊維不織布（Ｂ）の高高性が低下し、見かけ密度が高くなるので好ましくない。逆に、３０ｍｍを超えると開繊性が悪くなり、均質性が低下するので好ましくない。とりわけ、繊維長が３～１５ｍｍのものが、高高性と均質性の良好な点において好ましい。さらに、短繊維（Ｂ）は、捲縮が付与されたもの及び無捲縮のものが使用できる。とりわけ、高高性が良好な点において、短繊維（Ｂ）は捲縮付与されたものが好ましい。捲縮としては螺旋型、ジグザグ型、Ｕ字型等が例示され、好ましくは螺旋型とＵ字型である。また、抄紙法を用いて短繊維不織布（Ｂ）を製造する場合は、捲縮が付与された短繊維（Ｂ）を用いなければならない。抄紙法で捲縮繊維を用いなければならない理由は、この方法がウェッブ形成の媒体に水を用い、その媒体の力学的な作用によって高高性が失われ、得られる不織布の空隙が小さくなり、吸収性物品の表面材に用いた場合体液の透過性に劣りかつ保液しやすいためである。

【００２９】短繊維（Ｂ）は、各種のポリエチレン、ポリプロピレン等のポリオレフィン系樹脂、ポリエステル系樹脂、ポリアミド系樹脂等の各種組合せによる熱融着性を有する複合繊維である。短繊維（Ｂ）を熱融着性複合短繊維とした理由は、後述する特定の構造を保持するためである。熱融着性複合短繊維とは、繊維表面の少なくとも一部に、低融点成分が形成される２成分系以上、例えば、３成分若しくは４成分、からなる複合短繊維である。しかし、特定の用途を除いて、経済性からみて２成分が好ましい。熱融着性複合短繊維（Ｂ）に用いられる樹脂及びその組み合わせは短繊維不織布（Ａ）の場合に開示された熱可塑性樹脂及びその組み合わせをそのまま利用することができる。しかし、その選択は短繊維不織布（Ａ）の場合と独立に行われる。更に、３成分以上の樹脂を使用した場合には短繊維不織布（Ａ）の場合と同様に高融点側及び低融点側が定義される。また、該熱融着複合短繊維（Ｂ）は、鞘芯型、偏心鞘芯型、並列型、多層型、海島型の複合繊維が使用できる。また用途により短繊維（Ｂ）は、着色剤、耐光剤、難燃剤、抗菌剤などが添加されていても良い。さらに、熱融着性複合短繊維（Ｂ）の断面は、円形であっても異形であっても良く、これら断面を持った熱融着性複合短繊維（Ｂ）は、中空型であっても、そうでなくても良い。

【００３０】短繊維不織布（Ｂ）は、上述した方法で製

造された熱融着性複合短繊維（Ｂ）の内、樹脂の組み合わせの異なるもの、断面形状の異なるもの、中空型またそうでないもの、繊維長の異なるもの、繊度の異なるものの各種組合せによる２種以上の熱融着性複合短繊維（Ｂ）の混綿によって構成されていても良い。さらに、短繊維不織布（Ｂ）は、前記熱融着性複合短繊維（Ｂ）から構成される１層であっても良いし、２層以上であっても良い。短繊維不織布（Ｂ）を２層以上にする場合、短繊維不織布（Ｂ）は、不織布の厚み方向に密度勾配を付与させたものが好ましい。すなわち、短繊維ウェッブ（Ｂ）は、密度が次第に増大するように、もしくは密度が次第に減少するように密度勾配を形成させ堆積接合させることが好ましい。この様に短繊維不織布（Ｂ）に密度勾配を付与する理由は、液体の密度が粗な部分から密な部分へ移動する性質によって体液の透過性が向上し、かつ透過した後の逆戻りを防止し、吸収性物品の表面材等の使用にさらに好適になるためである。

【００３１】本発明において特に重要なことは、使用する短繊維不織布（Ｂ）が、構成する該熱融着性複合短繊維（Ｂ）をランダムかつボーラスに配列させて、集積接合している点である。すなわち、前記短繊維不織布（Ｂ）は、該熱融着性複合短繊維（Ｂ）から構成され、かつ熱融着性複合短繊維同士は熱融着され、形成される短繊維接点の交差角分布が短繊維不織布（Ｂ）の総接点数の少なくとも５０％を交差角６０～９０°で占めていることを特徴とするものである。交差角６０～９０°の百分率（％）は、短繊維不織布（Ｂ）のランダム性或いはボーラス性の尺度として用いた。また、交差角６０～９０°の百分率（％）は、２つの短繊維が交差接合して形成される４角のうち最小の角度を測定し、これを交差角として、この測定を１００点以上行い、交差角分布を求め、交差角６０～９０°に含まれる交差角の数をＡ、測定した交差角の総数をＭとし、Ａ／Ｍ×１００で求めた。

【００３２】短繊維不織布（Ｂ）を構成する熱融着性複合短繊維がランダムかつボーラスに配列しなければならない理由は、吸収性物品の表面材に使用した場合に、体液の透過性能に優れるという効果を発揮するためである。すなわち、エアレイド法や抄紙法を用いて得られる短繊維不織布（Ｂ）は、構成する短繊維がランダムかつボーラスに配列しているために、カード法による不織布に見られる不織布の機械方向への毛細管的な作用が起こりにくくなり、体液の透過が、不織布上で体液が繊維の配列方向に広がることなく行われるからである。さらに、この短繊維不織布（Ｂ）を構成する短繊維（Ｂ）は、短繊維の繊維長が充分に短いために、比較的不織布の厚み方向に繊維が配列している。このため、得られる短繊維不織布（Ｂ）は、クッション性に優れ、高高で見かけ密度が十分に低下し、かつ不織布の厚み方向の毛細管的な作用を有しており、本発明の複合化不織布を、特に要求性能の厳しい吸収性物品の表面材として使用した場合、尿、汗、血液等の体液の透過性、スポット透過性及びサラット感を更に向上させ、かつ透過した体液の逆戻りを防止するという効果を奏するのである。

【００３３】以上のような構成を持つ短繊維不織布（Ｂ）は、例えば以下のようにして製造されるものである。すなわち、熱融着性複合短繊維（Ｂ）と親水性短繊維を混綿し、これを開繊してエアレイド不織布加工機に供給する。供給された短繊維は、エアレイド不織布加工機によって開繊飛散され捕集コンベア上に堆積される。この操作を多段的に行った多層短繊維ウェッブ（Ｂ）を、熱融着性複合短繊維（Ｂ）の低融点成分の融点以上、高融点成分の融点以下の加熱気体流の中に導入し、熱融着性複合短繊維（Ｂ）の低融点成分を軟化または溶融させることで短繊維相互間を接合し短繊維不織布（Ｂ）を得るのである。また、短繊維（Ｂ）の不織布化は、後述するように、短繊維不織布（Ａ）との複合化と共に行われても良い。すなわち短繊維（Ｂ）の不織布化は、エアレイド不織布加工機で飛散させた短繊維（Ｂ）を走行する短繊維不織布（Ａ）上もしくは短繊維ウェッブ（Ａ）上に、直接堆積させた後、熱風加熱処理する事で短繊維不織布（Ａ）との複合化と共に行われても良い。

【００３４】本発明に係る複合化不織布は、上記した短繊維不織布（Ａ）と短繊維不織布（Ｂ）とが少なくとも２種複合化されたものである。短繊維不織布（Ａ）と短繊維不織布（Ｂ）の複合化は、短繊維層（Ａ）と短繊維不織布（Ｂ）の積層接合であっても、短繊維層（Ａ）と短繊維ウェッブ（Ｂ）の積層接合であっても良い。ここで言う短繊維層（Ａ）は、短繊維不織布（Ａ）もしくは短繊維ウェッブ（Ａ）のことである。短繊維不織布（Ａ）と短繊維不織布（Ｂ）の複合化における短繊維層（Ａ）と短繊維層（Ｂ）の接合は、短繊維層（Ｂ）すなわち短繊維不織布（Ｂ）もしくは短繊維ウェッブ（Ｂ）に含まれる熱融着性複合短繊維の低融点成分を軟化または溶融させることで行われる。具体例としてはエンボスロール法、超音波加熱法、熱風加熱法等が挙げられる。また、この例外として短繊維不織布（Ａ）と短繊維不織布（Ｂ）の複合化は、ホットメルト等の各種接着剤や粘着剤によって行われても良く、接着剤や粘着剤の塗布パターンに制限はないが、少量の塗布が可能で複合化不織布の柔らかさを損なわない点においてスパイラルパターンが好ましい。とりわけ嵩高性が良好な点において、短繊維不織布（Ａ）と短繊維不織布（Ｂ）の複合化における短繊維層（Ａ）と短繊維層（Ｂ）の接合は熱風加熱法が好ましい。さらに、短繊維層（Ａ）が３０重量％以上の熱融着性複合短繊維もしくは低融点熱融着短繊維の混繊で構成され、かつ短繊維層（Ａ）及び短繊維層（Ｂ）に含まれるそれぞれの低融点成分の融点が、それぞれの高融点成分の融点よりも１５℃以上低い融点になるよう

に選定されることも好ましい。

【００３５】このように短繊維層（Ａ）及び短繊維層（Ｂ）における各成分の融点を選定する理由は、短繊維不織布（Ａ）と短繊維不織布（Ｂ）の複合化における短繊維層（Ａ）と短繊維層（Ｂ）の接合が、短繊維層（Ｂ）、すなわち短繊維不織布（Ｂ）もしくは短繊維ウェッブ（Ｂ）に含まれる熱融着性複合短繊維の低融点成分を軟化または溶融させることだけでなく、短繊維不織布（Ａ）の低融点成分を軟化または溶融させることでも行われ、かつ２種以上の熱融着性複合繊維を短繊維層（Ａ）に混綿もしくは短繊維層（Ｂ）に混綿した場合であっても、それぞれの低融点成分が熱融着の効果を発揮し、複合化不織布及び接合面の強度をさらに強固にする事ができるからである。

【００３６】この場合の熱風加熱処理は、短繊維層（Ａ）及び短繊維層（Ｂ）の低融点成分のうち最も高融点である成分の融点以上、短繊維層（Ａ）及び短繊維層（Ｂ）の高融点成分のうち最も低融点である成分の融点以下で行われることが好ましい。熱風加熱処理を短繊維層（Ａ）及び短繊維層（Ｂ）の低融点成分の最も高融点である成分の融点未満で行うと、短繊維不織布（Ａ）と短繊維不織布（Ｂ）の複合化における短繊維層（Ａ）と短繊維層（Ｂ）の接合が、全ての低融点成分によって行われないのであまり好ましくない。逆に、熱風加熱処理を短繊維層（Ａ）及び短繊維層（Ｂ）の高融点成分の最も低融点である成分の融点を越えて行うと、この高融点成分が熱によるダメージや収縮もしくは嵩の低下等を起こし、不均質な複合化不織布しか得られないので好ましくない。また、複合化不織布の短繊維層（Ａ）の厚み方向に密度勾配もしくは親水性繊維の混率に勾配を持たせる場合、短繊維層（Ａ）は、用途に応じて短繊維不織布（Ｂ）と接合する側を密にしても良いし、粗にしても良い。複合化不織布の短繊維層（Ｂ）の厚み方向に密度勾配を持たせる場合も同様に、短繊維層（Ｂ）は、適宜、用途に応じて短繊維不織布（Ａ）と接合する側を密にしても良いし、粗にしても良い。さらに、複合化不織布は、用途に応じどちらを表に使用しても良く、以上のようにして得られる２層の複合化不織布に、短繊維層（Ａ）または短繊維層（Ｂ）をさらに積層接合させ、複合化不織布を３層以上にして用いる事もできる。また、さらに上記２層以上の複合化不織布に上記以外の不織布、編織物、紙、フィルム等のシートを積層することもできる。とりわけ吸収性物品のトップシート或いはセカンドシートに用いる場合においては、短繊維不織布（Ｂ）側を体液の流れの上流側に設定することが好ましく、その場合の密度勾配は、体液の流れの上流側から順に密にすることが好ましい。

【００３７】複合化不織布は、短繊維不織布（Ａ）側を体液の流れの上流側にしても下流側にしても本発明の特性、効果を発揮できるが、特に複合化不織布の短繊維不織布（Ａ）側を体液の流れの下流側にすると、短繊維（Ａ）が不織布の長手方向すなわち機械方向に配列しているため、実質的に体液を不織布の機械方向に拡散させ、体液の流れの最も下流にある吸収層中の高吸収性ポリマーに有効に分配し、いわゆる横漏れを防止する事ができる。さらに、このカード不織布層すなわち短繊維不織布（Ａ）は、短繊維（Ａ）が不織布の長手方向すなわち機械方向に配列しているために、厚み方向での加重に対する反発力が劣っている。しかしながら、このことが体液を透過した後、複合化不織布に加重が加えられた時に生じる逆戻り防止の効果を奏するのである。すなわち、体液を透過した複合化不織布に加重が加えられ余剰の体液の滲み出しによって生じる逆戻りを、加重に対する反発力に劣るがために、短繊維不織布（Ａ）がその加重によって高密度になり体液を保持することで防止するのである。

【００３８】また、短繊維不織布（Ａ）は、後述するような特定の構造にすることで、上記複合化不織布特有の機能をより充実させる事ができる。すなわち、短繊維不織布（Ａ）を構成する繊維同士が接触あるいは接合されて形成される接点の交差角分布が不織布（Ａ）の総接点数の少なくとも５０％を交差角０～３０°で占めさせることである。交差角０～３０°の百分率（％）は、短繊維不織布（Ａ）の繊維の配向性或いは異方性の尺度として用いた。また、交差角０～３０°の百分率（％）は、２つの短繊維が交差接合あるいは交差接触して形成される４角のうち最小の角度を測定し、これを交差角として、この測定を１００点以上行い、交差角分布を求め、交差角０～３０°に含まれる交差角の数をＡ、測定した交差角の総数をＭとし、Ａ／Ｍ×１００で求めた。

【００３９】ただし、このように複合化不織布を短繊維不織布（Ｂ）を体液の流れの上流側にして、体液が透過する部分（トップシート、セカンドシートなど）のうち、特に直接肌に接触するトップシートに用いる場合は、注意が必要である。それは、前述した短繊維不織布（Ｂ）を構成する短繊維が比較的不織布の厚み方向に配列し、繊維末端が多く存在することから直接肌に接触させたときに皮膚を刺激し、かぶれの原因になる点への注意である。このような問題は、前記したように複合化不織布を３層以上にすることで解決できる。すなわち、複合化不織布の短繊維不織布（Ｂ）側にさらに不織布を積層接合させることで、繊維末端が多く存在する短繊維不織布（Ｂ）を被覆し、皮膚に対する刺激を軽減させることで解決できるのである。例えば、その積層接合させる不織布には、スパンボンド不織布や短繊維不織布（Ａ）を含むカード不織布といった短繊維不織布（Ｂ）以外の各種不織布を使用でき、その各種不織布の目付は５～１５ｇ／㎡の範囲が好ましい。目付を上記範囲にした理由は、５ｇ／㎡未満になると、積層接合する不織布の厚みが薄くなりすぎて、構成繊維を固定化（不織布化）させ

る際や、固定化された積層接合する不織布を巻き取る際等において、取扱いが困難であったり、均質性が低下するので好ましくない。逆に、１５ｇ／㎡以上になると、積層接合する不織布自体の性質が発揮され、上述した短繊維不織布（Ｂ）の特徴或いは効果を阻害するために好ましくない。また、積層接合する不織布に短繊維不織布（Ａ）を用いるような場合、交差角を前記鋭角に分布せしめることは、スポット透過性を悪くするため好ましくない。

【００４０】本発明において、特に好ましい短繊維不織布（Ａ）と短繊維不織布（Ｂ）の複合化の態様は、熱風加熱法による短繊維層（Ａ）と短繊維ウェッブ（Ｂ）の積層接合である。熱風加熱法による短繊維層（Ａ）と短繊維ウェッブ（Ｂ）の積層接合とは、短繊維不織布（Ａ）もしくは短繊維ウェッブ（Ａ）上に直接短繊維ウェッブ（Ｂ）を堆積させ、短繊維ウェッブ（Ｂ）に含まれる熱融着性複合短繊維の低融点成分の融点以上、高融点成分の融点以下の加熱気体流の中に導入熱処理して、短繊維不織布（Ａ）と短繊維不織布（Ｂ）を接合する事である。この様にして得られる短繊維層（Ａ）と短繊維ウェッブ（Ｂ）の積層接合、すなわち短繊維不織布（Ａ）もしくは短繊維ウェッブ（Ａ）と短繊維ウェッブ（Ｂ）の積層接合による複合化不織布は、短繊維不織布（Ａ）と短繊維不織布（Ｂ）の積層接合のごとき通常の接合構造とは異なり、接合面において、短繊維ウェッブ（Ｂ）が短繊維不織布（Ａ）もしくは短繊維ウェッブ（Ａ）の空隙に入り込み、層間において互いの短繊維同士の接着点が３次元的に形成され、かつ比較的不織布の厚み方向に、短繊維層（Ｂ）の短繊維が配列した構造になっている。このため、熱風加熱法による短繊維層（Ａ）と短繊維ウェッブ（Ｂ）の積層接合で得られる複合化不織布は、短繊維不織布（Ａ）と短繊維不織布（Ｂ）の層間にアンカー効果が生じ、吸収性物品の表面材として使用時に予想される外的なずれ応力やよれ応力に対する形態安定性に優れる。

【００４１】また、短繊維不織布（Ａ）と短繊維不織布（Ｂ）の層間においても短繊維層（Ｂ）を構成する短繊維（Ｂ）が比較的不織布の厚み方向に配列しているため、クッション性に優れ、嵩高で見かけ密度が十分に低く、かつ不織布の厚み方向への毛細管的な作用がさらに向上し、吸収性物品の表面材に用いた場合、体液の透過性能及びスポット透過性に優れ、かつ透過した体液の逆戻り性を低化させている。この様に、短繊維不織布（Ａ）と短繊維不織布（Ｂ）の複合化は、吸収性物品の表面材に用いた場合の形態安定性及び体液の透過性、スポット透過性に優れ、かつ透過した体液の逆戻り性が低い点において、熱風加熱法による短繊維層（Ａ）と短繊維ウェッブ（Ｂ）の積層接合が好ましいのである。また、この熱風加熱法による短繊維層（Ａ）と短繊維ウェッブ（Ｂ）の積層接合においても、短繊維層（Ａ）を３０重量％以上の熱融着性複合短繊維もしくは低融点熱融着短繊維の混繊で構成し、かつ短繊維層（Ｂ）の低融点成分及び短繊維層（Ｂ）の低融点成分の融点が、お互いの高融点成分の融点よりも１５℃以上低融点になるように選定されていることが好ましい。この場合の熱風加熱処理も、短繊維層（Ａ）及び短繊維層（Ｂ）の低融点成分のうち最も高融点である成分の融点以上、短繊維層（Ａ）及び短繊維層（Ｂ）の高融点成分のうち最も低融点である成分の融点以下で行われることが好ましく、特に熱風加熱による短繊維ウェッブ（Ａ）と短繊維ウェッブ（Ｂ）の積層接合においては、短繊維ウェッブ（Ａ）と短繊維ウェッブ（Ｂ）の不織布化ならびに複合化が同時に行われるため、これが必要条件となる。

【００４２】以下、本発明に係る短繊維層（Ａ）と短繊維ウェッブ（Ｂ）の積層接合による複合化不織布の製造法の例を説明する。まず、熱融着性短繊維と他の繊維が混合解繊したものを従来公知のカード機に供給し、これより所定の作用によって紡出された均一なウェッブ（Ａ）を得る。続いて、短繊維ウェッブ（Ａ）は、短繊維ウェッブ（Ａ）を固定化するために、加熱した彫刻ロールと平滑ロールの間で部分的に熱圧着処理され、短繊維不織布（Ａ）としてエアレイド不織布加工機に搬送される。ここで短繊維層（Ａ）を短繊維ウェッブ（Ａ）のまま用いるのであれば、短繊維ウェッブ（Ａ）は、彫刻ロールと平滑ロールの間で部分的な熱圧着を行わずに、そのままエアレイド不織布加工機に搬送される。次に、短繊維層（Ｂ）となる短繊維（Ｂ）群が、エアレイド不織布加工機によって開繊飛散された後、サクションブロアーによって吸引されながら、搬送されてくる短繊維層（Ａ）上に堆積され、短繊維層（Ａ）と短繊維ウェッブ（Ｂ）の積層体を形成し、熱風加熱乾燥機に搬送される。熱風加熱乾燥機に搬送された短繊維層（Ａ）と短繊維ウェッブ（Ｂ）の積層体は、短繊維ウェッブ（Ｂ）のみ或いは短繊維層（Ａ）と短繊維ウェッブ（Ｂ）の両層に含まれる熱融着性複合短繊維の低融点成分の融点以上、高融点成分の融点以下で熱風加熱乾燥機によって熱処理され、複合化不織布として巻き取られる。

【００４３】本発明は、複合化不織布からなる表面材及び、体液を保持する吸収体よりなる吸収性物品、例えば生理用ナプキン、使い捨ておむつ、失禁用パッド、おりものシート等を提供するものである。本発明で言う表面材とは、トップシート、バックシート、サイドギャザ等、吸収性物品の表面を形成する部材及び、吸収体の包材やセカンドシートの様な部材等も含むものを言う。本発明の吸収性物品は、表面材のうち少なくともトップシート或いはセカンドシートに複合化不織布を用いることを特徴としている。本発明の一例として第１図及び第２図により、さらに詳しく説明すると、生理用ナプキン１は、液体透過性のトップシート２と液体不透過性のバックシート４、体液を吸収保持する吸収体５とから成り、

吸収体５はトップシート２とバックシート４との間に配置されている。さらに、吸収体５は、包材９に包まれている。また、バックシート４のパンティーと接触する側には、接着層１２が設けられ、この接着層１２を覆うようにリリースライナー１３が配置されている。また、トップシート２と体液拡散層１１との間に液体透過性のセカンドシート３を配置する場合もある。包材９と吸収体５の間に体液拡散層１１を配置する場合もある。生理用ナプキン１は、様々な形状に形成できるが、ほとんどの場合、およそ長方形状を有しており、端縁部は、各々円弧形状部６として形成される。吸収体５は、一般にバックシート４よりも小さく、様々な形状に形成できるが、ほとんどの場合、およそ長方形状を有しており、その吸収体部の端部はバックシート４の形状に対応し円弧形状部７として形成されることがある。吸収部材としての吸収体５の長手側部１０及び吸収性物品１の長手側部８は、装着時のフィット性を考慮し、内側に湾曲させ、中央部分を若干狭く形成してもかまわない。

【００４４】本発明の吸収性物品は、上記構成を持つ吸収性物品の表面材のうち、少なくともトップシート２、セカンドシート３のいずれかに、本発明の複合化不織布を用いることを特徴とする。また、トップシート２とセカンドシート３の両方ともが本発明の複合化不織布で構成されたものを用いることもできる。本発明の複合化不織布は、短繊維不織布（Ａ）と短繊維不織布（Ｂ）の複合化されたものである。バックシート４は、液体不透過性を十分に有するものであれば、特に制限はなく、例えば、編織物、不織布、フィルム等がその例に挙げられる。具体例としては、熱可塑性樹脂に炭酸カルシウム等のフィラーを加えて延伸した液不透過性でかつ蒸気を透過させる蒸気透過性のシートなどがある。好ましくは、肌に近い感触を有したもの、例えば上記フィルムと不織布或いは編織物との複合材等であり、前記複合化不織布及び複合化不織布と他の不織布やフィルム或いは編織物との複合材を用いてもかまわない。

【００４５】吸収体５は、親水性繊維と高分子吸収体（Ｓｕｐｅｒ Ａｂｓｏｒｂｅｎｔ Ｐｏｌｙｍｅｒ）を主体としている。ここで言う親水性繊維には、レーヨン、キュプラ、アセテート、ビニロン、ナイロン、蛋白・アクリロニトリル共重合糸、綿、羊毛、絹、麻、パルプ等が挙げられ、好ましくは、レーヨン、キュプラ、アセテート、パルプ等のセルロース系繊維であるが、実質的には、ほとんどの場合パルプが使用されている。パルプ繊維は、吸収体に従来から用いられている物であれば特に制限はないが、そのパルプ繊維の平均繊維長は、粉砕、積層、圧縮処理等を考慮すると、通常０．８～５ｍｍの範囲にあることが好ましい。

【００４６】高分子吸収体は、従来から用いられている物であれば特に制限されないが、高分子吸収体の飽和吸収量は２５ｇ／ｇ以上であることが望ましく、繊維状及び粒子状のものが使用できる。なお飽和吸収量は、２５０メッシュのナイロン製ティーバックに高分子吸収体１ｇを導入し、これを過剰量の０．９重量％食塩水中に１時間浸漬させ、１５分間水切りを行った後の増加重量として求められる。高分子吸収体が粒子状の場合は、その粒子径が１００～８００μｍであることが望ましい。具体的な高分子吸収体の組成としては、ポリアクリル酸ソーダ、アクリル酸ビニルアルコール共重合体、ポリアクリル酸ソーダ架橋体、デンプン－アクリル酸グラフト共重合体、イソブチレン－無水マレイン酸共重合体またはそのケン化物、ポリアクリル酸カリウム、ポリアクリル酸セシウム等が好適である。高分子吸収体の配合率は、吸収体の総重量に対し特別な場合を除き５～１０重量％の範囲であり、これら高分子吸収体は単独で、或いは複数種の混合によって使用することができる。また、吸収体に、熱融着性複合短繊維を混綿する事も好ましい。熱融着性複合短繊維の混率は、吸収体に使用される繊維総重量の０～６０％が好ましい。熱融着性複合短繊維を混綿する理由は、熱融着性複合短繊維を熱処理することで吸収体全体に熱融着性複合短繊維が接合したネットワークが形成され、装着者の動きによる圧縮およびずれ応力やよれ応力に対して形態安定の効果を発揮し、吸収体の体液吸収性能の低下を防止するためである。

【００４７】一般に吸収体は、形状保持やいわゆる粉落ち防止等のために、包材９に覆われている。包材９は、レーヨン、キュプラ、アセテート、ビニロン、ナイロン、蛋白・アクリロニトリル共重合糸、綿、羊毛、絹、麻、パルプ等の親水性短繊維を主体に構成され、好ましくは、レーヨン、キュプラ、アセテート、パルプ等のセルロース系繊維であるが、実質的には、ほとんどの場合パルプが使用されている。包材９に熱融着性複合短繊維を混綿する事もできる。熱融着性複合短繊維の混率は、吸収体に使用される繊維総重量の０～６０％が好ましい。熱融着性複合短繊維の混綿が好ましい理由は、吸収体の場合と同様に熱融着性複合短繊維を熱処理することで吸収体全体に熱融着性複合短繊維が接合したネットワークが形成され、装着者の動きによる圧縮およびずれ応力やよれ応力に対して形態安定の効果を発揮し、体液吸収性能の低下を防止するためと、さらにトップシート２やバックシート４等の表面材と加熱ロール法や超音波加熱法等で融着接合する場合に、強固な接合点を形成し、吸収性物品全体としての形態安定性に優れるためである。吸収体及び包材に使用する熱融着性複合短繊維としては、表面材の複合化不織布に用いる短繊維（Ｂ）の場合に開示されたものが使用できる。さらに、熱融着性複合短繊維は、二成分以上、例えば、３若しくは４成分から成る熱融着性複合短繊維であっても良い。しかし、経済性を考慮すれば、特殊な用途を除いて２成分で十分である。吸収体及び包材に使用する熱融着性複合短繊維のカット長は、シート状に形成することが可能な範囲であ

って、特に制限されないが、好ましくは、３～９０ｍｍである。

【００４８】さらに、包材９と吸収体５の代わりに、包材９と吸収体５が一体化された吸収層を使用することも好ましい。ここでいう包材９と吸収体５が接合一体化された吸収層とは、上記吸収体を上記親水性短繊維に１０～６０重量％の上記熱融着性複合短繊維を混綿した不織布で挟み込み接合一体化して、所望の形態に一体裁断したものであり、例えば以下のように製造される。すなわち、包材９と吸収体５が接合一体化された吸収層は、エアレイド法を用い、上記親水性短繊維に０～６０重量％の上記熱融着性複合短繊維を混綿したものを開繊飛散させ堆積させる。続けてこの上に上記親水性繊維と上記高分子吸収体の混合物を開繊飛散させ堆積させ、さらにこの上に上記親水性短繊維に１０～６０重量％の上記熱融着性複合短繊維を混綿したものを開繊飛散させ堆積させ、熱処理によって接合一体化した後、一体裁断して得られる。包材９と吸収体５の一体化における接合は、短繊維ウェッブに含まれる熱融着性複合短繊維の低融点成分を軟化または溶融させることで行われ、具体例としてはエンボスロール法、超音波加熱法、熱風加熱法等が挙げられる。とりわけ嵩高性が良好な点において、熱風加熱法が好ましい。また、より強力な接合の為、上記包材９と吸収体５が一体化された吸収層の吸収体５に上記熱融着性複合短繊維を混綿することも好ましい。このような吸収層は、吸収性物品へ加工する際に、吸収体からの粉落ちが少なく、取り扱いやすい点において好ましい態様である。

【００４９】一般に、吸収性物品は、体液の出口と接触する点において多量の体液を吸収し、吸収体は飽和状態となる。体液は、この点から放射状に広がり、脚に最も近い部分から漏れる、いわゆる横漏れを生じさせる。この横漏れ防止を図る好ましい対策の一つとして体液拡散層１１を、トップシート２と吸収体５の間に介在させることができる。体液拡散層１１は、体液を迅速に吸収拡散させ、体液の吸収を吸収体全体で行わせることで体液の総合吸収量を向上させるものである。体液拡散層１１には、編織物、不織繊維集合体、多孔フィルム等が例示され、実質的には不織繊維集合体が一般的である。ここで言う不織繊維集合体とは、短繊維ウェッブや長繊維フリース、スライバー等の繊維集合体およびこれらを布状に成形した短繊維不織布や長繊維不織布、メルトブローン不織布等の不織布のことである。体液拡散層１１は、体液の良好な搬送性と拡散性とを発現させる点において、親水性であることが好ましい。体液拡散層１１は、その表面に界面活性剤等の親水化剤を塗布または付着させ親水性に処理することができる。特に、体液拡散層１１が熱可塑性樹脂で構成される場合、この熱可塑性樹脂に親水化樹脂や界面活性剤等の親水化剤を練り込み、繊維またはフィルムを成形することで、あらかじめ体液拡散層１１を親水性にすることができる。

【００５０】親水性樹脂としては、エチレングリコール等のエーテル類や、ビニルアルコールの単独重合体及びこのエチレンまたはプロピレンとの共重合体、ポリエーテルブロックアミド共重合体等が例示でき、具体例としては熱可塑性ポリエチレングリコール（商品名アクアコーク；住友精化（株）製）、エチレンビニルアルコール共重合体（商品名エバール；クラレ（株）製）、ポリエーテルブロックアミド共重合体（商品名ＰＥＢＡＸ；ＡＴＯＣＨＥＭ社製）である。主体となる熱可塑性樹脂へこれら親水性樹脂を練り込む場合の添加率（重量％）は、２０～１００重量％が好ましく、上記親水化樹脂より適宜に選択して単独で或いは２種以上の混合物として添加できる。また、界面活性剤としては、高級アルコール硫酸エステル塩、アルキルベンゼンスルホン酸塩、高級アルコールリン酸エステル塩等のアニオン界面活性剤、アルキルアミン塩、第４級アミン塩等のカチオン界面活性剤或いはポリオキシエチレンアルキルエーテル類、ポリオキシエチレンアルキルエステル類、多価アルコールアルキルエステル類等の非イオン界面活性剤が例示できる。主体となる熱可塑性樹脂へこれら界面活性剤を練り込む場合の添加率（重量％）は、０．０５～１０、０重量％が好ましく、上記界面活性剤より適宜に選択して単独で或いは２種以上の混合物として添加できる。さらに、親水化樹脂や界面活性剤等の親水化剤を練り込んだ繊維またはフィルムの表面に、界面活性剤等の親水化剤を塗布または付着することもできる。また、トップシート２と体液拡散層１１との間に設置される場合があるセカンドシート３は、クッション性の付与をしたり、体液が体液拡散層へ到達するまでに事前に体液をある程度分配あるいは拡散する補助機能を付与したり、吸収体に吸収した体液を肌側に逆戻りするのを防止することができる。

【００５１】体液拡散層１１に用いる編織物や不織繊維集合体を構成する繊維には、短繊維または長繊維を使用することができ、その繊度は０．５～１８ｄ／ｆの物が使用できる。繊維の繊度が０．５ｄ／ｆ未満であると、生産性を維持させるための高速紡糸による曳糸性の低下や、曳糸性を維持させるための生産性の低下が起こるので好ましくない。逆に繊度が１８ｄ／ｆを超えると、繊維の剛性が高くなって、柔軟性に富む不織繊維集合体が得られないので好ましくない。また、不織繊維集合体の目付けは、５～１５０ｇ／㎡が好ましい。不織繊維集合体の目付けが、５ｇ／㎡未満になると、厚みが薄くなりすぎて、吸収性物品に成形する時に取扱いが困難であったり、均質性が低下するので好ましくない。逆に、１５０ｇ／㎡を超えると不織繊維集合体の剛性が高くなり、柔軟性が低下するので好ましくない。編織物や不織繊維集合体を構成する繊維としては、表面材の複合化不織布に用いる短繊維（Ａ）の場合に開示されたものが使用で

きる。さらに、繊維が熱可塑性の場合、繊維は、１成分よりなる繊維であっても良いし、２成分以上、例えば、３成分若しくは４成分から成る複合繊維であっても良い。しかし、経済性を考慮すれば、特殊な用途を除いて２成分で十分である。

【００５２】編織物や不織繊維集合体を構成する繊維は、捲縮が付与されたもの及び非捲縮のものが使用できる。とりわけ、嵩高性が良好で、かつ逆戻り性の低さに優れる点において、繊維は捲縮付与されたものが好ましい。捲縮としては螺旋型、ジグザグ型、Ｕ字型等が例示され、好ましくは螺旋型とＵ字型である。また、編織物や不織繊維集合体を構成する繊維は、鞘芯型、偏心鞘芯型、並列型、多層型、海島型の複合繊維が使用できる。またデザイン性や機能性付与のために繊維は、着色剤、抗菌剤などが添加されていても良い。さらに、繊維の断面は、円形であっても異形であっても良く、これら断面を持った繊維は、中空型であっても、そうでなくても良い。特に、体液の良好な搬送性と拡散性とを発現させる点において、繊維の断面は異形であることが好ましく、その断面の異形度は、１．３以上であることが好ましい。なお、異形度は、異形糸の周長をＬ、異形糸の断面積をＳとしたとき、Ｌ／（２√（πＳ））で求められる。

【００５３】体液拡散層として用いる編織物や不織繊維集合体は、上述した繊維のうち、長繊維または短繊維、短繊維で繊維長の異なるもの、複合型または単一型、複合型の場合は樹脂の組み合わせの異なるもの、さらに複合型の場合は熱融着性または熱融着性でないもの、単一型の場合は樹脂の異なるもの、断面形状や異形度の異なるもの、中空型またはそうでないもの、親水剤や抗菌剤等の添加剤を添加したものまたはそうでないもの、添加剤の異なるもの、繊維長の異なるもの、繊度の異なるものの各種組合せによる２種以上の繊維の混綿或いは混繊によって構成されていても良い。さらに、体液拡散層である編織物や不織繊維集合体は、上記繊維から構成される単層であっても良いし、２層以上であっても良い。体液拡散層１１は、トップシート２と吸収体５の間に導入される。吸収体５が、包材９で覆われている場合、体液拡散層１１は、トップシート２と包材９の間に導入してもよいし、包材９と吸収体５の間に導入してもよい。とりわけ、ホットメルト接着剤等による接合時に体液拡散層１１の目詰まりを避ける点において、包材９と吸収体５の間に導入する事が好ましい。

【００５４】本発明において図１及び２に示した生理用ナプキン１以外の態様として、生理用ナプキンに１対のウイングもしくは１対のサイドギャザ或いはその両方を備えたものも好ましい。ウイングは、吸収性物品長手側部８の中央付近よりトップシート２及びバックシート４を延長して形成しても良いし、トップシート２やバックシート４以外の部材を吸収体長手側部８の中央付近に接合させて形成しても良い。使用時においてウイングは、パンティーの下に折り返され、パンティーを包み込むようにして装着されており、少なくとも２つの目的により提供される。第１の目的は、特にパンティーの端部において２重のバリアを構成する事で、血液等の体液による装着者及びパンティーの汚れを防止することであり、第２の目的は、ウイングのパンティー側表面に配された接着層によって、適正な位置に固定することである。サイドギャザは、吸収体長手側部８のやや内側でトップシート２より上部に突出或いは突出部を内側に折り畳んだ状態で、吸収性物品の長手方向に沿って形成される。サイドギャザは、体液の横漏れ防止のために提供され、この機能を果たすためにバックシート４と同様に液体不透過性である。

【００５５】トップシート２やセカンドシート３、バックシート４、包材９、吸収体５、体液拡散層１１、ウイング、サイドギャザ等の各部材間における接合は、ホットメルト接着剤やその他接着剤、粘着剤もしくは加熱ロール法や超音波加熱法等の融着接合によって行われる。また、バックシート４に配された接着層１２やウイングのパンティー側表面に配された接着層には、ホットメルト接着剤やその他接着剤、粘着剤が用いられている。接着層１２は、接着層１２の保護等のためにリリースライナー１３に覆われている。

【００５６】

【作用】本発明に係る複合化不織布は、短繊維不織布（Ａ）と短繊維不織布（Ｂ）が接合された複合化不織布であって、前記短繊維不織布（Ｂ）は、少なくとも２種の高融点成分と低融点成分との熱可塑性樹脂からなる熱融着性複合短繊維であり、かつ、該熱融着性複合短繊維同士は熱融着され、形成される短繊維接点の交差角分布が短繊維不織布（Ｂ）の総接点数の少なくとも５０％を交差角６０～９０°で占めている。すなわち複合化不織布を構成する短繊維不織布（Ｂ）のランダム性が高くなっており、さらに、この短繊維不織布（Ｂ）は、エアレイド法を用いて得られ、かつ構成する短繊維（Ｂ）の繊維長が充分に短いために、比較的不織布の厚み方向に繊維が配列している。従って、本発明に係る複合化不織布は、嵩高で見かけ密度が十分に低下しており、不織布の長手方向すなわち機械方向への毛細管的な作用が起こりにくいがために、保液しにくく、かつ不織布の厚み方向への毛細管的な作用に優れている。

【００５７】さらに、本発明に係る複合化不織布の製造法は、少なくとも２種の高融点成分と低融点成分との熱可塑性樹脂からなる熱融着性複合短繊維ウェッブ（Ｂ）をエアレイド法により開繊飛散させながら、短繊維が集積されてなる短繊維層（Ａ）上に堆積した後、堆積された短繊維ウェッブ（Ｂ）に含まれる熱可塑性樹脂の低融点成分の融点以上、高融点成分の融点以下で熱処理する事によって行うものである。このため本製造法すなわち

短繊維層（Ａ）と短繊維ウェッブ（Ｂ）の積層接合による複合化不織布は、短繊維不織布（Ａ）と短繊維不織布（Ｂ）の積層接合のごとき通常の接合構造とは異なり、接合面において、短繊維ウェッブ（Ｂ）が短繊維層（Ａ）、すなわち短繊維不織布（Ａ）もしくは短繊維ウエッブ（Ａ）用のウェッブの空隙に入り込み、短繊維（Ａ）と短繊維（Ｂ）の接着点が三次元的に形成され、かつ比較的不織布の厚み方向に短繊維（Ｂ）が配列した構造になっている。従って、本製造法による複合化不織布は、短繊維不織布（Ａ）と短繊維不織布（Ｂ）の層間のアンカー効果に優れている。また、かつ短繊維不織布（Ａ）と短繊維不織布（Ｂ）の層間においても短繊維（Ｂ）が比較的不織布の厚み方向に配列しているため、さらに嵩高で見かけ密度が低く、かつ不織布の厚み方向への毛細管的な作用が向上している。

【００５８】

【実施例】以下、本発明に係る複合化不織布を吸収性物品の表面材として評価した実施例について詳述するが、本発明はこれらに限定されるものではない。実施例を詳述する前に、本発明に係る複合化不織布の物性値等の定義と測定方法について説明する。

【００５９】（目付け）不織布の重量を面積で割り、不織布１ｍ²当たりの重量（ｇ）で表したもの。

（剪断強度）吸収性物品の表面材として使用したときに予想されるずれ応力やよれ応力に対する形態安定性を、剪断強度として評価した。複合化不織布を、幅５ｃｍ、長さ１５ｃｍの大きさに切断し、長手方向の両端より短繊維層（Ａ）と短繊維層（Ｂ）を長さ６．５ｃｍ剥離させ、中央２ｃｍだけが複合化不織布になった試料を用意した。この試料を、定速引張試験機を用い、試料の長手方向の端部は、短繊維層（Ａ）を、その反対側の端部は短繊維層（Ｂ）をつかみ、破断するまで引張試験を行った。この破断した試料の破断状態を観察し、材料破壊したものを○、短繊維層（Ａ）と短繊維層（Ｂ）がはっきり層分離していないものを△、短繊維層（Ａ）と短繊維層（Ｂ）がはっきり層分離したものを×とし、剪断強度として表した。

（表面風合い）肌触り等の感触を、モニター１０名による感触試験により表面風合いとして評価した。試験方法は、モニターが試料を手指で把持し、柔らかいもしくは風合いがよいと感じるか否かを判断し、柔らかいもしくは風合いがよいと判定した試料に１点／１名で加点していった。

（見かけ密度）東洋精機株式会社のデジシックネステスターを用い、試料の３．５ｃｍφの範囲に２．０ｇ／ｃｍ²の荷重を加た時の厚みを０．１Ｄｃｍとし、試料の目付けをＭ×１０⁻⁴ｇ／ｃｍ²としたとき、見かけ密度は、Ｍ／（Ｄ×１０００）なる式で算出されるものであり、その単位は、ｇ／ｃｍ³である。

（透過速度）複合化不織布の透過性を透過速度として評価した。市販の紙オムツから分離した吸収体の上にティッシュを乗せた。この上に試料が水平になるように乗せ、さらにこの上に、５０ｍｍφで肉圧が４ｍｍ、重量が５０ｇの円筒を乗せた。この円筒内に５０ｃｃの生理食塩水を、一気に投入し、投入してから試料に吸収されるまでの時間を測定し、透過速度とした。

（にじみ性）スポット透過性をにじみ性として評価した。透過速度を測定した後に、試料に広がった生理食塩水の痕跡の向かい合う境界が最長となるところの距離をＬとし、（Ｌ－５０）／５０で得られる値をにじみ性として表した。

（保液性）サラット感は、官能評価であるが、便宜的に保液性として評価した。透過速度とにじみ性を評価した後の試料の重量を測定し、その値をＸとし、試料を乾燥機に投入し水分を除去したときの重量をＹとしたとき、（Ｘ－Ｙ）／Ｙ×１００で得られる値を保液性とした。

（逆戻り性）透過速度を測定後３分間放置し、吸収性シート上にある試料に濾紙を乗せ、５ｋｇの荷重を３０秒間加えたとき、濾紙が吸い取った生理食塩水の重量を逆戻り性として表した。

（ランダム性）複合化不織布の短繊維層（Ａ）及び（Ｂ）について、２つの短繊維が交差接合（（Ａ）のみの場合は交差接触もある））して形成される４角のうち最小の角度を測定し、これを交差角とした。この測定を１００点以上行い、交差角分布を求め、交差角６０～９０°に含まれる交差角の数をＡ、測定した交差角の総数をＭとしたとき、Ａ／Ｍ×１００で得られる値をランダム性として表した。

【００６０】（実施例１）繊度２デニール、カット長３８ｍｍ、ジグザグ型捲縮のポリプロピレン短繊維を準備し、パラレルカード機に供給した。目付１２ｇ／ｍ²の短繊維ウェッブ（Ａ）を得た。この短繊維ウェッブ（Ａ）を１４５℃に加熱した凹凸ロールと平滑ロールによって構成されたポイントボンド加工機に導入し、熱圧着加工を行った。この短繊維不織布（Ａ）をエアーレイド不織布加工機の捕集コンベアに供給した。繊度２デニール、カット長１０ｍｍのポリプロピレン樹脂を芯成分、高密度ポリエチレン樹脂を鞘成分とし偏心芯鞘型断面の螺旋捲縮を持った熱融着性複合短繊維（Ｂ）を開繊し、エアレイド不織布加工機に供給した。供給された短繊維（Ｂ）を、エアレイド不織布加工機によって開繊飛散させ、捕集コンベアに供給した前記短繊維不織布（Ａ）上に堆積させて、短繊維不織布（Ａ）と短繊維ウェッブ（Ｂ）の積層物を得た。なお、短繊維ウェッブ（Ｂ）の目付けは１２ｇ／ｍ²とした。この短繊維不織布（Ａ）と短繊維ウェッブ（Ｂ）の積層物を、１３８℃の加熱気体流の中に導入し、熱融着性複合短繊維（Ｂ）の低融点成分である高密度ポリエチレン樹脂を溶融させ、短繊維（Ｂ）相互間および短繊維層（Ａ）と短繊維層（Ｂ）の層間を接合して複合化不織布を得た。得られ

た複合化不織布を整理用ナプキンの表面材のトップシートとして使用した。吸収性が良好で、液戻りも少なく吸収性物品に好適なものであった。

【００６１】（実施例２）繊度２デニール、カット長３８ｍｍ、のポリプロピレン樹脂を芯成分、高密度ポリエチレン樹脂を鞘成分とし偏心芯鞘型断面の螺旋捲縮を持った熱融着性複合短繊維（Ａ）を準備した。前記熱融着性複合短繊維（Ａ）をパラレルカード機に供給し、目付１２ｇ／ｍ²の短繊維ウェッブ（Ａ）を得た。この短繊維ウェッブ（Ａ）をエアーレイド不織布加工機の捕集コンベアに供給した。繊度２デニール、カット長１０ｍｍのポリプロピレン樹脂を芯成分、高密度ポリエチレン樹脂を鞘成分し偏心芯鞘型の螺旋捲縮を持った熱融着性複合短繊維（Ｂ）を開繊し、エアレイド不織布加工機に供給した。供給された短繊維（Ｂ）を、エアレイド不織布加工機によって開繊飛散させ、捕集コンベアに供給した前記短繊維ウェッブ（Ａ）上に堆積させて、短繊維ウェッブ（Ａ）と短繊維ウェッブ（Ｂ）の積層物を得た。なお、短繊維ウェッブ（Ｂ）の目付けは１２ｇ／ｍ²とした。この短繊維ウェッブ（Ａ）と短繊維ウェッブ（Ｂ）の積層物を、１３８℃の加熱気体流の中に導入し、熱融着性複合短繊維（Ａ）、（Ｂ）の低融点成分である高密度ポリエチレン樹脂を溶融させ、短繊維不織布（Ａ）、（Ｂ）の短繊維相互間および短繊維層（Ａ）と短繊維層（Ｂ）の層間を接合して複合化不織布を得た。得られた複合化不織布を整理用ナプキンの表面材のトップシートとして使用した。吸収性が良好で、液戻りも少なく吸収性物品に好適なものであった。

【００６２】（実施例３）短繊維（Ｂ）のカット長を、５ｍｍとした他は、実施例２と同様の条件で複合化不織布を製造した。得られた複合化不織布を整理用ナプキンの表面材のセカンドシートとして使用した。吸収性が良好で、液戻りも少なく吸収性物品に好適なものであった。

【００６３】（実施例４）短繊維（Ｂ）のカット長を、３０ｍｍとした他は、実施例２と同様の条件で複合化不織布を製造した。得られた複合化不織布を整理用ナプキンの表面材のセカンドシートとして使用した。吸収性が良好で、液戻りも少なく吸収性物品に好適なものであった。

【００６４】（実施例５）短繊維（Ａ）のカット長を５１ｍｍにし、短繊維層（Ａ）に、繊度が３デニールでカット長が４５ｍｍのレーヨンを３０重量％混綿した他は、実施例３と同様の条件で複合化不織布を製造した。得られた複合化不織布を整理用ナプキンの表面材のトップシートとセカンドシートとして使用した。吸収性が良好で、液戻りも少なく吸収性物品に好適なものであった。

【００６５】（実施例６）短繊維層（Ａ）に、繊度が３デニールでカット長が４５ｍｍのレーヨンを７０重量％混綿した他は、実施例５と同様の条件で複合化不織布を製造した。得られた複合化不織布を整理用ナプキンの表面材のトップシートとセカンドシートとして使用した。吸収性が良好で、液戻りも少なく吸収性物品に好適なものであった。

【００６６】（比較例１）繊度２デニール、カット長３８ｍｍのポリプロピレン樹脂からなる短繊維（Ａ）を準備した。前記短繊維（Ａ）をパラレルカード機に供給し、目付１２ｇ／ｍ²の短繊維ウェッブ（Ａ）を得た。この短繊維ウェッブ（Ａ）を１４５℃に加熱した凹凸ロールと平滑ロールによって構成されたポイントボンド加工機に導入し、熱圧着加工を行った。この短繊維不織布（Ａ）をエアーレイド不織布加工機の捕集コンベアに供給した。繊度２デニール、カット長３８ｍｍ、ジグザグ型捲縮のポリプロピレン樹脂を芯成分、高密度ポリエチレン樹脂を鞘成分とする熱融着性複合短繊維（Ｂ）（本発明では熱融着性複合短繊維（Ａ）に該当するが短繊維不織布（Ａ）と区別するため（Ｂ）とした）をパラレルローラーカード加工機に導入開繊し、目付けが１２ｇ／ｍ²の短繊維ウェッブ（Ｂ）を得た。この短繊維ウェッブ（Ａ）と短繊維ウェッブ（Ｂ）を積層した後、１３８℃の加熱気体流の中に導入し、熱融着性複合短繊維の低融点成分である高密度ポリエチレン樹脂を溶融させ、短繊維ウェッブ（Ａ）、（Ｂ）の短繊維相互間および短繊維不織布（Ａ）と短繊維不織布（Ｂ）の層間を接合して複合化不織布を得た。

【００６７】（比較例２）短繊維（Ａ）をポリプロピレン樹脂を芯成分、高密度ポリエチレン樹脂を鞘成分とする熱融着性複合短繊維（Ａ）とし、短繊維（Ｂ）をランダムウェッバー法で処理する以外は実施例２と同様にして複合化不織布を得た。

【００６８】

【表１】

			実施例 1	実施例 2	実施例 3	実施例 4	実施例 5	実施例 6	比較例 1	比較例 2
短繊維不織布A	熱融着複合繊維	繊維種別	非複合型	熱融着複合型	熱融着複合型	熱融着複合型	熱融着複合型	熱融着複合型	非複合型	熱融着複合型
		複合ﾀｲﾌﾟ	−	偏心芯鞘型	偏心芯鞘型	偏心芯鞘型	偏心芯鞘型	偏心芯鞘型	−	偏心芯鞘型
		捲縮ﾀｲﾌﾟ	ジグザク型	螺旋型	螺旋型	螺旋型	螺旋型	螺旋型	ジグザグ型	螺旋型
		使用樹脂	ＰＰ	ＰＰ／ＰＥ	ＰＰ／ＰＥ	ＰＰ／ＰＥ	ＰＰ／ＰＥ	ＰＰ／ＰＥ	ＰＰ	ＰＰ／ＰＥ
		ﾃﾞﾆｰﾙ×ｶｯﾄ長	2d×３８mm	2d×３８mm	2d×３８mm	2d×３８mm	2d×６１mm	2d×５１mm	2d×３８mm	2d×３８mm
	親水性繊維	混率(重量%)	０	０	０	０	３０	７０	０	０
		素材	−	−	−	−	レーヨン	レーヨン	−	−
		ﾃﾞﾆｰﾙ×ｶｯﾄ長	−	−	−	−	3d×４５mm	3d×４５mm	−	−
	目付(g/m²)		１２	１２	１２	１２	１２	１２	１２	１２
	ランダム性（%）		３１	４０	１２	３７	４１	３２	３５	３６
	交差角０～３０度（%）		３５	２５	５２	２９	２３	３３	３０	３１
短繊維不織布B	使用樹脂		ＰＰ／ＰＥ	ＰＰ／ＰＥ	ＰＰ／ＰＥ	ＰＰ／ＰＥ	ＰＰ／ＰＥ	ＰＰ／ＰＥ	ＰＰ／ＰＥ	ＰＰ／ＰＥ
	複合ﾀｲﾌﾟ		偏心芯鞘型	偏心芯鞘型	偏心芯鞘型	偏心芯鞘型	偏心芯鞘型	偏心芯鞘型	芯鞘型	芯鞘型
	捲縮ﾀｲﾌﾟ		螺旋型	螺旋型	螺旋型	螺旋型	螺旋型	螺旋型	ジグザグ型	ジグザグ型
	ﾃﾞﾆｰﾙ×ｶｯﾄ長		2d×１０mm	2d×１０mm	2d×５mm	2d×８０mm	2d×５mm	2d×５mm	2d×３８mm	2d×３８mm
	目付(g/m²)		１２	１２	１２	１２	１２	１２	１２	１２
	ｳｪｯﾌﾞ形成法		ｴｱｰﾚｲﾄﾞ法	ｴｱｰﾚｲﾄﾞ法	ｴｱｰﾚｲﾄﾞ法	ｴｱｰﾚｲﾄﾞ法	ｴｱｰﾚｲﾄﾞ法	ｴｱｰﾚｲﾄﾞ法	ｶｰﾄﾞ法	ﾗﾝﾀﾞﾑｳｪｯﾊﾞｰ
	ランダム性（%）		５５	５６	６２	５１	６６	５７	３１	３７
複合化法			熱風加熱法	熱風加熱法	熱風加熱法	熱風加熱法	熱風加熱法	熱風加熱法	熱風加熱法	熱風加熱法
見かけ密度(g/cm³)			０．０３０	０．０１９	０．０２２	０．０１８	０．０２１	０．０２２	０．０３３	０．０２６
剪断強度			△	○	○	○	○	○	×	△
表面風合い			９	１０	８	１０	９	１０	８	９
透過速度（秒）			６	５	４	７	４	４	１５	１６
にじみ性（%）			２０	２２	１６	１８	１８	１７	６０	７０
保液性（%）			４０	３９	４０	３５	４０	４２	７０	６７
逆戻り性（g）			１．０	１．３	０．８	１．１	１．２	１．１	２．４	１．８

ＰＰ：ポリプロピレン
ＰＥ：ポリエチレン（ここでは高密度ポリエチレンのこと）

【００６９】表１の結果より明らかなとおり、実施例に係る複合化不織布は、比較例に係る複合化不織布に比べ、短繊維層（Ｂ）のエアーレイド不織布とカード不織布が同目付けのもので構成されているにも拘らず、見かけ密度が小さく、表面の風合いに優れ、更に剪断強度、透過速度、にじみ性、保液性、逆戻り性、ランダム性全てにおいて優れている。従って、実施例に係る複合化不織布は、吸収性物品の表面材として使用したときに予想されるずれ応力やよれ応力に対する形態安定性に優れると共に、見かけ密度が低いために表面の風合いに優れ、複合化不織布の長手方向すなわち機械方向への毛細管的

な作用が低く、かつ複合化不織布の厚み方向への毛細管的な作用に優れるがために透過速度、にじみ性、保液性、逆戻り性に優れている。すなわち、本発明に係る複合化不織布は、従来の積層不織布では困難であった高い剪断強度と表面風合いの良さを両立させ、さらに複合化に用いる短繊維不織布（Ｂ）に高いランダム性を付与させることで、使い捨ておむつや生理用ナプキン等の吸収性物品の表面材として固有の特性である尿、汗、血液等の体液の透過性の良さ、スポット透過性、サラット感、また透過した体液の逆戻り性の低さを満足させているのである。

【００７０】なお、以上主として、本発明に係る複合化不織布が、吸収性物品の表面材として使用する場合について説明したが、本発明に係る複合化不織布は、前述したように、手術用着衣、掛け布、ハップ材の基布等の他、フィルター材、土木資材等にも好適に使用しうるものである。

【００７１】

【発明の効果】本発明に係る複合化不織布は、前述した構造による作用から、以下に示す効果を有する。

（１）複合化不織布を構成する短繊維不織布（Ｂ）のランダム性が高く、かつ短繊維不織布（Ｂ）を構成する短繊維（Ｂ）が不織布の厚み方向に配列しているため、クッション性に優れる。

（２）複合化不織布の見かけ密度が十分に低いため、高高かつ表面の風合いが良好で、吸収性物品の表面材として使用した場合、肌触りに優れる。

（３）複合化不織布の長手方向すなわち機械方向への毛細管的な作用が起こりにくいため、吸収性物品の表面材として使用した場合、スポット透過性に優れる。

（４）複合化不織布の長手方向すなわち機械方向への毛細管的な作用が低く、かつ複合化不織布の厚み方向への＊

＊毛細管的な作用に優れるため、吸収性物品の表面材として使用した場合、体液の透過性に優れる。

（５）複合化不織布の見かけ密度が十分に低く、かつ不織布の厚み方向への毛細管的な作用に優れるために、吸収性物品の表面材として使用した場合、透過した体液の逆戻り性が低い。

（６）不織布の長手方向すなわち機械方向への毛細管的な作用が起こりにくいため、保液性が低く、吸収性物品の表面材として使用した場合、サラット感に優れる。

（７）接合した短繊維不織布（Ａ）と短繊維不織布（Ｂ）の層間のアンカー効果が優れるため、吸収性物品の表面材として使用した場合、ずれ応力やよれ応力に対する形態安定性に優れる。

【図面の簡単な説明】

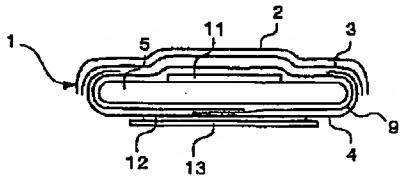
【図１】本発明の複合化不織布を一部に用いた整理用ナプキンの一例の肌側から見た展開平面図である。

【図２】図１のＸ－Ｘ´部分の断面の概略端面図である。

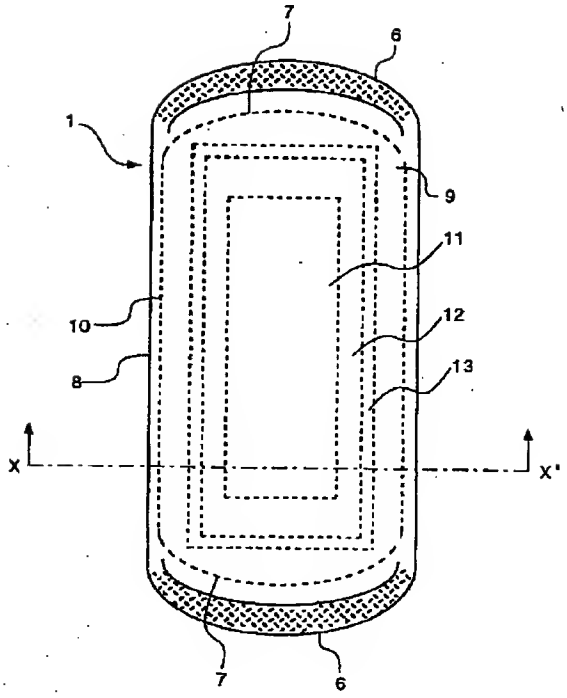
【符号の説明】

１　整理用ナプキン
２　トップシート
３　セカンドシート
４　バックシート
５　吸収体
６　生理用ナプキン長手方向縁端部
７　吸収体長手縁端部
８　整理用ナプキン長手側部
９　包材
１０　吸収体長手側部
１１　体液拡散層
１２　接着層
１３　リリースライナー

【図２】



【図１】



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(54) COMPOSITE NONWOVEN CLOTH AND ABSORBING MATERIAL USING THE SAME

(57)Abstract:
PROBLEM TO BE SOLVED: To obtain a composite nonwoven cloth having bulkiness, excellent feeling and touch, and excellent in permissibility of urine, etc., or spot permissibility with a slight turn back property and useful for an absorbing material, etc., by subjecting respectively specific short fibers nonwoven cloth, etc., to heat fusion to a specific state.
SOLUTION: This composite nonwoven cloth has ≥2 joined layers of (A) a short fibers nonwoven cloth comprising ≥30 wt.% of heat fusible conjugate fibers having 38-90 mm fiber length and containing a thermoplastic resin of more than two kinds of high-melting component and low-melting component and ≤70 wt.% of hydrophilic fibers with (B) a short fibers nonwoven cloth having 3-30 mm fiber length. The component B is composed of heat fusible conjugate short fibers comprising a thermoplastic resin of more than two kinds of high-melting component and low-melting component, and respective of the heat fusible conjugate short fibers are heat fused, and 60-90° crossing angles of formed contact points of the short fibers occupy ≥50 % of whole contact points in the component B.

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* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
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CLAIMS

[Claim(s)]
[Claim 1] It is at least the two-layer compound-ized nonwoven fabric to which the staple fiber nonwoven fabric (A) with a fiber length of 38-90mm and the staple fiber nonwoven fabric (B) with a fiber length of 3-30mm were joined. Said staple fiber nonwoven fabric (B) It is the thermal melting arrival nature compound staple fiber which consists of thermoplastics of at least two sorts of high-melting components, and a low-melt point point component. And these thermal melting arrival nature compound staple fibers are the compound-ized nonwoven fabrics characterized by the crossover angular distribution of the staple fiber contact which are formed by being carried out forming at least 50% of the total number of contacts of a staple fiber nonwoven fabric (B) with the crossed axes angle of 60-90 degrees thermal melting arrival.
[Claim 2] The compound-ized nonwoven fabric according to claim 1 whose mixed ratio of hydrophilic fiber a staple fiber nonwoven fabric (A) consists of the thermal melting arrival nature bicomponent fiber (C) and the hydrophilic fiber (D) which consist of thermoplastics of at least two sorts of high-melting components, and a low-melt point point component, and is 70 or less % of the weight.
[Claim 3] The compound-ized nonwoven fabric according to claim 1 or 2 whose at least 50% of the total number of contacts of a nonwoven fabric (A) is the crossed axes angle of 0-30 degrees in the crossover angular distribution of a contact in which it is contacted or joined and the fiber which constitute a staple fiber nonwoven fabric (A) is formed.
[Claim 4] The compound-ized nonwoven fabric given in any of claims 1-3 they are with which a staple fiber nonwoven fabric (A) has a density gradient in the thickness direction.
[Claim 5] The compound-ized nonwoven fabric given in any of claims 1-4 they are with which a staple fiber nonwoven fabric (B) has a density gradient in the thickness direction.
[Claim 6] The compound-ized nonwoven fabric given in any of claims 1-5 they are heat-treated below with the melting point of a high-melting component more than the melting point of the low-melt point point component of the thermal melting arrival nature bicomponent fiber with which a staple fiber nonwoven fabric (A) is contained in this nonwoven fabric.
[Claim 7] The manufacturing method of the compound-ized nonwoven fabric characterized by to heat-treat below with the melting point of a high-melting component, and to form a staple fiber nonwoven fabric (B) more than the melting point of the low-melt point point component of the thermoplastics contained in staple fiber Webb who deposited after depositing thermal melting arrival nature compound staple fiber Webb who consists of thermoplastics of at least two sorts of high-melting components, and a low-melt point point component on a staple fiber nonwoven fabric (A), carrying out filamentation scattering by the air RAID method.
[Claim 8] Absorptivity [nonwoven fabric / according to claim 1 to 6 / compound-ized] goods using one or more sorts in the top sheet of facing, and a second sheet.

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0010]
[Field of the Invention] This invention is bulky and relates to aesthetic property, the good compound-ized nonwoven fabric of a feel and its manufacturing method, and the absorptivity goods using it. In more detail Absorptivity goods, such as a disposable diaper and a sanitary napkin, It can be used suitable for a filter material besides being the clothes for an operation, a credit cloth, the base fabric of HAPPU material, etc., engineering-works materials, etc. The permeability of body fluid especially required of the top sheet of absorptivity goods, such as a disposable diaper and a sanitary napkin, It is related with spot permeability, a feeling of SARATTO, the compound-ized nonwoven fabric that is excellent in the transmitted lowness of the reversion nature of body fluid and its manufacturing method, and absorptivity goods using the compound-ized nonwoven fabric of this invention further.
[0011]
[Description of the Prior Art] Since the staple fiber nonwoven fabric obtained by the technique represented by the card method is constituted by the staple fiber which is excellent in homogeneity and has crimp, its feels, such as the touch, are good bulky. However, the staple fiber which constitutes the nonwoven fabric arranges the staple fiber nonwoven fabric obtained using the card method in the longitudinal direction (production direction of a nonwoven fabric) of a machine, i.e., direction, of a nonwoven fabric, and it is inferior to random nature in it extremely. for this reason, the case where it uses for the facing, especially the top sheet of absorptivity goods although the tensile strength of the direction of a machine was strong and excellent in the working characteristic (high-speed productivity) of absorptivity goods -- the operation with this staple fiber nonwoven fabric like [the direction of a machine of a nonwoven fabric] a capillary tube -- working -- the time of transparency of body fluid -- body fluid -- the array direction of fiber -- breadth -- easy -- there was being inferior to permeability and a fault of being easy to carry out liquid retaining.
[0012] On the other hand, as the Webb forming method for treating fiber with comparatively short fiber length rather than the card method, the paper-making method and the air RAID method are learned. Any approach carries out suction accumulation, after distributing a staple fiber in water or a medium called air, and it forms Webb. For this reason, the nonwoven fabric by this both-hands method has the random array direction of fiber, and when it uses for the facing, especially the top sheet of absorptivity goods, it excels in spot permeability. However, although the nonwoven fabric into which the fiber of non-crimp was processed by the paper-making method was high intensity comparatively, when the loft was extremely inferior and it used as facing of absorptivity goods, it was inferior to permeability, and it had the fault that feels, such as about [that it is easy to carry out liquid retaining] and the touch, were bad. Being easy to carry out liquid retaining of the permeability of this nonwoven fabric, and the feel bad, crimp is not discovered to the staple fiber of configuration fiber, and the reason nil why feels, such as the touch, are bad is because apparent density gravity is high and there are few content air contents. Therefore, if a staple fiber with crimp is used, it will be thought that the good staple fiber nonwoven fabric of a feel is obtained. However, the nonwoven fabric into which fiber with

crimp was processed by this approach Although a loft improves and being excelled in the lowness of the permeability of body fluid, spot permeability, a feeling of SARATTO, and the reversion nature of the transmitted body fluid, since the array of fiber is random, By passing a card radical, as compared with the nonwoven fabric in which fiber carried out orientation, the reinforcement of the direction of a machine was comparatively small, and there was a fault of being inferior to the working characteristic (high-speed productivity) of absorptivity goods harder [which is easy to be torn]. Moreover, although the nonwoven fabric by the air RAID method is excellent in the lowness of the permeability of body fluid, spot permeability, a feeling of SARATTO, and the reversion nature of the transmitted body fluid when it is bulky and uses for the facing, especially the top sheet of absorptivity goods rather than the nonwoven fabric generally obtained by the paper-making method By the same reason as the case where a crimped staple is used for a paper-making method, the reinforcement of the direction of a machine was comparatively small, and there was a fault of being inferior to the working characteristic (high-speed productivity) of absorptivity goods harder [which is easy to be torn].

[0013] Thus, it was difficult for which staple fiber nonwoven fabric to have the advantage and demerit, and to reconcile these advantages in a monolayer. The nonwoven fabric which carried out the laminating of the staple fiber nonwoven fabric by a random carding machine etc. and the staple fiber nonwoven fabric by the usual carding machine to JP,58-180651,A is indicated by the similar technique of reconciling the advantage of these staple fiber nonwoven fabric. However, since the crossed axes angle between staple fibers from which the staple fiber nonwoven fabric by the random carding machine given in this technique produces some random nature by friction between fiber in case fiber is **********(ed) with the needle of a carding machine, since it is obtained after all using the card method, although given tends to form an acute angle and the staple fiber which constitutes the nonwoven fabric in addition is carrying out orientation in the longitudinal direction of a machine, i.e., direction, of a nonwoven fabric, it is inferior to random nature. For this reason, when it used as facing of absorptivity goods, since the operation like [the direction of a machine of a nonwoven fabric] a capillary tube worked and body fluid tends to have spread in the array direction of fiber at the time of transparency of body fluid, this staple fiber nonwoven fabric and this laminating nonwoven fabric might say that it is easy to carry out [that it is inferior to permeability, and] liquid retaining, and it was lacking in spot permeability and easy to relapse into it. That is, the laminating nonwoven fabrics concerning this technique were not the penetrable goodness of body fluid, such as urine which is the property of a proper as facing of absorptivity goods, such as a disposable diaper and a sanitary napkin, sweat, and blood, spot permeability, a feeling of SARATTO, and the thing whose satisfaction is possible about the transmitted lowness of the reversion nature of body fluid.

[0014]

[Problem(s) to be Solved by the Invention] The 1st purpose of this invention is offering aesthetic property and the good compound-ized nonwoven fabric of a feel with bulky, and the 2nd purpose is to raise the permeability of body fluid, such as urine, sweat, and blood, spot permeability, and a feeling of the touch, and offer the low compound-ized nonwoven fabric of reversion nature, and its manufacturing method, when it is used for the member which body fluid, such as facing of the severe absorptivity goods of especially a military requirement especially a top sheet, or a second sheet, penetrates. As a result of repeating research wholeheartedly that the above-mentioned technical problem should be solved, this invention persons by compound-izing the staple fiber nonwoven fabric and a certain specific staple fiber nonwoven fabric by the card method Fully reduce the apparent density gravity of a compound-ized nonwoven fabric, and the touch of tensile strength is highly good. It knows that it will excel in the permeability and spot permeability of body fluid which are furthermore required of the facing of absorptivity goods, such as a disposable diaper and a sanitary napkin, and the low compound-ized nonwoven fabric of reversion nature can be offered, and came to complete this invention.

[0015]

[Means for Solving the Problem]

(1) It is at least the two-layer compound-ized nonwoven fabric to which the staple fiber

nonwoven fabric (A) with a fiber length of 38-90mm and the staple fiber nonwoven fabric (B) with a fiber length of 3-30mm were joined. Said staple fiber nonwoven fabric (B) is a thermal melting arrival nature compound staple fiber which consists of thermoplastics of at least two sorts of high-melting components, and a low-melt point point component. And these thermal melting arrival nature compound staple fibers are the compound-ized nonwoven fabrics characterized by the crossover angular distribution of the staple fiber contact which are formed by being carried out forming at least 50% of the total number of contacts of a staple fiber nonwoven fabric (B) with the crossed axes angle of 60-90 degrees thermal melting arrival.
(2) from the thermal melting arrival nature bicomponent fiber (C) with which a staple fiber nonwoven fabric (A) consists of thermoplastics of at least two sorts of high-melting components, and a low-melt point point component, and hydrophilic fiber (D) -- becoming -- and the mixing ratio of hydrophilic fiber -- a compound-ized nonwoven fabric given in (1) term whose rate is 70 or less % of the weight.
(3) the crossover angular distribution of a contact in which it is contacted or joined and the fiber which constitute a staple fiber nonwoven fabric (A) is formed -- setting -- the compound-ized nonwoven fabric of (1) which is 30 degrees or a publication in the crossed axes angle 0 - (2) terms of at least 50% of the total number of contacts of a nonwoven fabric (A).
(4) The compound-ized nonwoven fabric given in any of (1) - (3) term they are with which a staple fiber nonwoven fabric (A) has a density gradient in the thickness direction.
(5) The compound-ized nonwoven fabric given in any of (1) - (4) term they are with which a staple fiber nonwoven fabric (B) has a density gradient in the thickness direction.
(6) The compound-ized nonwoven fabric given in any of (1) to (5) term they are heat-treated below with the melting point of a high-melting component more than the melting point of the low-melt point point component of the thermal melting arrival nature bicomponent fiber with which a staple fiber nonwoven fabric (A) is contained in this nonwoven fabric.
(7) The manufacturing method of the compound-ized nonwoven fabric characterized by to heat-treat below with the melting point of a high-melting component, and to form a staple fiber nonwoven fabric (B) more than the melting point of the low-melt point point component of the thermoplastics contained in staple fiber Webb who deposited after depositing thermal melting arrival nature compound staple fiber Webb who consists of thermoplastics of at least two sorts of high-melting components, and a low-melt point point component on a staple fiber nonwoven fabric (A), carrying out filamentation scattering by the air RAID method.
(8) Absorptivity [nonwoven fabric / given in either of the (1) - (6) terms / compound-ized] goods using one or more sorts in the top sheet of facing, and a second sheet.
[0016]
[Embodiment of the Invention] By taking the above-mentioned configuration, this invention conquers the staple fiber nonwoven fabric (A) at the time of using as independent, and the weak spot of (B) by making it a compound-ized nonwoven fabric, and the description is that it is pulling out both merit to the maximum extent. Namely, a staple fiber nonwoven fabric (A) reinforces substantially the lowness of the tensile strength of the direction of a machine of a staple fiber nonwoven fabric (B). Since the staple fiber (A) has arranged in the longitudinal direction of a machine, i.e., direction, of a nonwoven fabric, are generated. It is having prevented reversion of the body fluid with which the body fluid permeability ability which was excellent in the staple fiber nonwoven fabric (B) in the badness of spot permeability of a staple fiber nonwoven fabric (A) raised the body fluid permeability of a compound-ized nonwoven fabric, spot permeability, and a feeling of SARATTO, and penetrated them. This invention is explained to a detail below. The compound-ized nonwoven fabric concerning this invention consists of a staple fiber nonwoven fabric (A) with a fiber length of 38-90mm and a staple fiber nonwoven fabric (B) of fiber length 3-30. The staple fiber layer which constitutes a staple fiber nonwoven fabric (A) is hereafter used into a staple fiber layer (A) or staple fiber Webb (A), the staple fiber which constitutes these further is used as a staple fiber (A), and, also in a staple fiber nonwoven fabric (B), it is made the same.
[0017] It comes to carry out accumulation junction of the staple fiber (A), and the staple fiber nonwoven fabric (A) as used in the field of this invention can be conventionally obtained using a

well-known carding machine, for example, a parallel card machine, a random carding machine, a random webber, etc. The fineness of the staple fiber which constitutes a staple fiber nonwoven fabric (A) can perform various use, such as detailed fineness (0.5 - 2 d/f), fine size (2 - 12 d/f), inside fineness (12 - 50 d/f), and ****** (50 - 1000 d/f), by the application. When using it especially for the facing of absorptivity goods, the fineness of a staple fiber (A) has 0.5-desirable 12d. the time of filamentation of the staple fiber (A) being carried out if the fineness of a staple fiber (A) becomes less than 0.5 d/f -- the needle of a filamentation machine -- a passage -- being hard -- since only the heterogeneous staple fiber nonwoven fabric with which the so-called nep exists is obtained, it is not desirable. Conversely, if the fineness of a staple fiber (A) exceeds 12 d/f, since the staple fiber nonwoven fabric (A) which is rich in flexibility by the rigidity of a staple fiber (A) becoming high will not be obtained, it is not desirable. When using it for the facing of absorptivity goods especially, the 0.5-6d [/f] thing of fineness is the most desirable. In addition, to the clothes for an operation, a credit cloth, and the base fabric of HAPPU material, wide range application of inside fineness (12 - 50 d/f) - ****** (50 - 1000 d/f) can be aimed at at fine size (2 - 12 d/f) and engineering-works materials.

[0018] Although the superintendent officer of a staple fiber nonwoven fabric (A) is arbitrary, when using it for the clothes for an operation, a credit cloth, the base fabric of HAPPU material, etc. by the application used, 5 - 150 g/m2 is desirable. Since handling is difficult or homogeneity falls when the superintendent officer of a staple fiber nonwoven fabric (A) becomes less than two 5 g/m in case the thickness of a staple fiber nonwoven fabric (A) becomes thin too much and staple fiber Webb (A) is made to fix, or in case the fixed staple fiber nonwoven fabric (A) is rolled round and the laminating of the staple fiber (B) is carried out to deposition or a staple fiber nonwoven fabric (B), it is not desirable. On the contrary, since the rigidity of the staple fiber nonwoven fabric itself will become high and flexibility will fall if 150 g/m2 is exceeded, it is not desirable. When using it for the facing of absorptivity goods especially, the superintendent officer of a staple fiber nonwoven fabric (A) has desirable 5 - 50 g/m2. Furthermore, what the crimp for **********(ing) with a carding machine was given is used for a staple fiber (A). As a crimp configuration, a spiral mold, a zigzag mold, a U character mold, etc. are illustrated, it divides, and a spiral mold and a U character mold are desirable in a point with a good loft.

[0019] As a staple fiber (A) which constitutes the staple fiber nonwoven fabric (A), the synthetic fiber which consists of thermoplastics or non-thermoplastics, a semi-synthetic fiber, a natural fiber, an inorganic fiber, etc. can be used. When a staple fiber (A) uses raw materials other than thermoplastics, in case a staple fiber (A) fixes staple fiber Webb (A), its thing of fusibility is desirable from the point that the variety of processing spreads to a solvent. When a staple fiber is thermoplasticity, a staple fiber (A) may be fiber which consists of one component, and may be a bicomponent fiber which consists of two or more components, 3 [for example,], or 4 components. However, if economical efficiency is taken into consideration, except for a special application, two components are enough. The thermoplastics which serves as a raw material of a staple fiber (A) here can illustrate polyolefine systems, such as various kinds of polyethylene and polypropylene, a polyester system, a polyamide system, a polyurethane system, etc., and is a polyolefine system especially preferably. Although you may be a non-thermal melting arrival nature bicomponent fiber and you may be a thermal melting arrival nature bicomponent fiber as a compound staple fiber, when the effectiveness of contact adhesion immobilization of the staple fibers of a staple fiber nonwoven fabric (A) and the effectiveness of the junction in compound-izing with the staple fiber nonwoven fabric (B) of a back process are taken into consideration, it is desirable that a thermal melting arrival nature bicomponent fiber is included. A thermal melting arrival nature compound staple fiber is a compound staple fiber more than the two-component system by which a low-melt point point component is formed in a part of fiber front face [at least].

[0020] As an example of the combination of a thermal melting arrival nature compound staple fiber, high density polyethylene/polypropylene, Straight chain-like low density polyethylene / polypropylene, low density polyethylene/polypropylene, the duality of a propylene and other alpha olefins -- a copolymer or a ternary polymerization object / polypropylene -- Straight chain-like low density polyethylene / high density polyethylene, low density polyethylene/high density

polyethylene, Various kinds of polyethylene/thermoplastic polyester, polypropylene/thermoplastic polyester, the duality of a propylene and other alpha olefins -- a copolymer or a ternary polymerization object / thermoplastic polyester -- Low-melt point point heat plasticity polyester / thermoplastic polyester, the duality of various kinds of polyethylene/nylon 6, polypropylene/nylon 6, a propylene, and other alpha olefins -- a copolymer or a ternary polymerization object / nylon 6, nylon 6 / Nylon 66, nylon 6/thermoplastic polyester, etc. can be mentioned.

[0021] In these, the combination which consists of polyolefine systems or a polyolefine system, and a polyester system is desirable, and can mention high density polyethylene / polypropylene, an ethylene propylene butene-1 crystallinity ternary polymerization object / polypropylene, or high density polyethylene/polyethylene terephthalate as the example. Furthermore, in these, polyolefine systems, for example, high density polyethylene/polypropylene, an ethylene propylene butene-1 crystallinity ternary polymerization object / polypropylene, etc. are desirable especially from a chemical-resistant field.

[0022] The melting point difference or softening temperature difference of a high-melting component and a low-melt point point component of this compound component has desirable 15 degrees C or more. For example, when this melting point or softening temperature is A>B>C, one [at least] melting point difference or softening temperature difference between AB(s) and between BC has 15 degrees C or more desirable [a thermal melting arrival nature compound staple fiber consists of thermoplastics of A B, and three sorts of C, and]. That is, when the thermoplastics which constitutes a thermal melting arrival nature compound staple fiber is put in order in order with the high melting point, or low order, it is desirable that at least one of the melting point difference of a ****** component or the softening temperature differences is 15 degrees C or more. Moreover, the melting point or softening temperature of three sorts of thermoplastics A, B, and C which constitutes a thermal melting arrival nature compound staple fiber is A>B>C, when a melting point difference or a softening temperature difference 15 degrees C or more is only between AB(s), A is defined as B and a high-melting component and C are defined as a low-melt point point component. Furthermore, the melting point or softening temperature of three sorts of thermoplastics A, B, and C which constitutes a thermal melting arrival nature compound staple fiber is A>B>C. When there is a melting point difference or a softening temperature difference 15 degrees C or more both between AB(s) and between BC, A is defined as a high-melting component, C is defined as a low-melt point point component, and after a compound staple fiber fulfills the conditions of being a thermal melting arrival compound staple fiber, even if B is treated by which of a high-melting component and a low-melt point point component, it does not interfere. That is, when a thermal melting arrival nature compound staple fiber consists of three or more sorts of thermoplastics, a low-melt point point component and a high-melting component are defined for the melting point difference or softening temperature difference of a ****** component when putting in order the thermoplastics which constitutes a thermal melting arrival nature compound staple fiber in order with the high melting point, or low order bordering on for 15 degrees C or more. When during this period [two or more] furthermore exist, after fulfilling the conditions that a low-melt point point component is formed in a part of fiber front face [at least], a low-melt point point component and a high-melting component may be defined bordering on between arbitration.

[0023] Furthermore, as the synthetic fiber which consists of the resin of non-thermoplasticity, a semi-synthetic fiber, a natural fiber, and an inorganic fiber, the fiber by phenol system resin, rayon, cuprammonium rayon, acetate, a carbon fiber, glass fiber, etc. can be illustrated. Moreover, the bicomponent fiber of a sheath-core type, an eccentric sheath-core type, a parallel connected type, a multilayer mold, and a sea-island type can be used for this compound staple fiber. Moreover, as for the staple fiber, the coloring agent, the illuminant-proof, the flame retarder, the antimicrobial agent, etc. may be added by the application. Furthermore, the cross section of a staple fiber may be circular, or you may be an anomaly, and the staple fiber with these cross sections may be a hollow mold, or may not be so. The staple fiber nonwoven fabric (A) may consist of two or more sorts of staple fibers (A). That is, in the case of that from which a staple fiber nonwoven fabric (A) differs in the combination of resin in the case of a compound

die or a single mold, and a compound die, the thing they are not thermal melting arrival nature or thermal melting arrival nature in the case of [whose] a compound die, and the single mold, it may be further constituted by cotton-mixing of two or more sorts of staple fibers (A) by various combination although it differs they are [cotton-mixing] the so-called thing of resin, the thing from which a cross-section configuration differs, a hollow mold or a thing without that right, and fineness. Moreover, a staple fiber nonwoven fabric (A) may be a monolayer which consists of above-mentioned staple fibers, and may be more than two-layer. When using a compound-ized nonwoven fabric for the member which body fluid penetrates, a compound-ized nonwoven fabric must be a hydrophilic property. In order to carry out hydrophilization of the compound-ized nonwoven fabric, a staple fiber (A) and (B) make hydrophilization agents, such as a surfactant, apply or adhere to the front face, and can be processed to a hydrophilic property. When a staple fiber (A) and (B) consist of thermoplastics especially, hydrophilization agents, such as hydrophilization resin and a surfactant, are scoured to this thermoplastics, and a staple fiber (A) and (B) can also be beforehand made into a hydrophilic property by fabricating fiber. Moreover, the example of hydrophilization resin or a surfactant and the application approach, and applicability are the same as the case of the body fluid diffusion layer of the absorptivity goods mentioned later.

[0024] In this invention, especially, as a desirable staple fiber nonwoven fabric (A), this thermal melting arrival nature compound staple fiber is contained 30% of the weight or more in a staple fiber nonwoven fabric, and between staple fibers is combined by the low-melt point point component of this thermal melting arrival nature compound staple fiber. Moreover, the thermal melting arrival nature staple fiber of 15-degree-C or more low-melt point point can be interwoven 30% of the weight or more rather than this configuration staple fiber, and the staple fiber nonwoven fabric which combined the main configuration staple fiber with this thermal melting arrival staple fiber can also be used for a main configuration staple fiber. Thus, like a thermal melting arrival nature compound staple fiber or a low-melt point point heat welding nature staple fiber, it is fibrous and is because the aesthetic property of the staple fiber nonwoven fabric (A) with which association of fiber is performed only in the point of contact instead of the shape of a field, and is obtained becomes good and the reason for combining between fiber is rich in flexibility. moreover, cotton-mixing of said thermal melting arrival nature compound staple fiber and hydrophilic staple fiber constitutes a staple fiber nonwoven fabric (A) -- you may have -- the rate of cotton-mixing of a hydrophilic staple fiber -- 0- of a staple fiber nonwoven fabric -- it is 0 - 30 % of the weight preferably 70% of the weight. Although the reason made into this range is excellent in the repeat permeability of body fluid mixing with cotton a hydrophilic staple fiber, it is because a thermal melting arrival nature compound staple fiber will become less than 30 % of the weight if the rate of cotton-mixing of a hydrophilic staple fiber exceeds 70 % of the weight, and gestalt maintenance of the staple fiber nonwoven fabric by the welding of a thermal melting arrival nature compound staple fiber becomes difficult.

[0025] In the hydrophilic staple fiber said here, rayon, cuprammonium rayon, acetate, Vinylon, nylon, protein and acrylonitrile copolymerization yarn, cotton, wool, silk, hemp, pulp, high-polymer absorbent (Super Absorbent Polymer) fiber, biodegradability fiber, etc. can be illustrated, and they are cellulosic fibers, such as rayon, cuprammonium rayon, acetate, cotton, and pulp, high-polymer absorbent fiber, and biodegradability fiber especially preferably. Moreover, a staple fiber nonwoven fabric (A) may be one layer which consists of said thermal melting arrival nature compound staple fiber or said thermal melting arrival nature compound staple fiber, and a hydrophilic staple fiber, and may be more than two-layer. When carrying out a staple fiber nonwoven fabric more than two-layer, a staple fiber nonwoven fabric (A) has the desirable thing which made the density gradient give in the thickness direction of a nonwoven fabric. That is, as for staple fiber Webb, it is desirable to make a density gradient form and to carry out deposition junction so that a consistency may decrease gradually so that a consistency may increase gradually. Moreover, the thing which made the blended ratio of hydrophilic fiber give inclination in the thickness direction of a nonwoven fabric is also desirable. That is, as for staple fiber Webb, it is desirable to carry out deposition junction so that it may decrease gradually so that the blended ratio of hydrophilic fiber may increase gradually. Thus, the reason for giving inclination to

a staple fiber nonwoven fabric (A) at the blended ratio of a density gradient or hydrophilic fiber is because the reversion after the permeability of body fluid improving with the property which moves to a place high from the low place of the property which moves to a dense part, or a hydrophilic property and penetrating from a part **** in the consistency of a liquid is prevented and it becomes still more suitable for use of the facing of absorptivity goods etc.

[0026] The staple fiber nonwoven fabric (A) with the above configurations is the following, and is made and manufactured. That is, that in which a thermal melting arrival nature staple fiber and other fiber carried out mixed **** is conventionally supplied to a well-known carding machine, and uniform Webb spun by the predetermined approach from this is obtained. And it introduces into the inside made full of a heating gas style, and a staple fiber nonwoven fabric (A) is obtained by heat-treating below with the melting point of a high-melting component more than the melting point of the low-melt point point component of the thermal melting arrival compound staple fiber contained in staple fiber Webb (A). Or when the thermal melting arrival nature fiber contained in staple fiber Webb (A) is a single fiber, a staple fiber nonwoven fabric (A) can be obtained by carrying out thermocompression bonding with the point bond processing machine constituted with for example, a concavo-convex roll and a smooth roll. Moreover, as staple fiber Webb's (A) immobilization (nonwoven-fabric-izing), not only the above-mentioned example, i.e., the hot blast heating method, but well-known technique, for example, the needle punch method, a high-pressure stream method, the embossing roll method, the ultrasonic heating method, etc. may be used, and you may be the combination of these technique. As combination of staple fiber Webb (A) immobilization (nonwoven-fabric-izing) Needle punch processing, embossing roll processing and needle punch processing, and ultrasonic heat-treatment, Needle punch processing, hot blast heat-treatment and high-pressure stream processing, embossing roll processing and high-pressure stream processing, ultrasonic heat-treatment and high-pressure stream processing, hot blast heat-treatment, etc. can be illustrated. These processings Although the sequence is not asked, it is more desirable to perform needle punch processing previously in the point of avoiding bad influences to the heat welding point formed of embossing roll processing, ultrasonic heat-treatment, and hot blast heat-treatment, such as destruction and cutting.

[0027] On the other hand, a staple fiber nonwoven fabric (B) has the specific configuration which comes to carry out accumulation junction and the staple fiber (B) of 3-30mm of cut length mentions later. The fineness of a staple fiber (B) can perform various use, such as detailed fineness (0.5 - 2 d/f), fine size (2 - 12 d/f), inside fineness (12 - 50 d/f), and ****** (50 - 1000 d/f), by the application. When using it especially for the facing of absorptivity goods, the fineness of a staple fiber (B) has 0.5-desirable 12d. the time of filamentation of the staple fiber (B) being carried out if the fineness of a staple fiber (B) becomes less than 0.5 d/f -- the needle of a filamentation machine -- a passage -- being hard -- since only the heterogeneous staple fiber nonwoven fabric (B) with which the so-called nep exists is obtained, it is not desirable. Conversely, if the fineness of a staple fiber (B) exceeds 12 d/f, since the staple fiber nonwoven fabric (B) which is rich in flexibility by the rigidity of a staple fiber (B) becoming high will not be obtained, it is not desirable. When using it for the facing of absorptivity goods especially, the 0.5-6d [/f] thing of fineness is the most desirable. In addition, to the clothes for an operation, a credit cloth, and the base fabric of HAPPU material, wide range application of inside fineness (12 - 50 d/f) - ****** (50 - 1000 d/f) can be aimed at at fine size (2 - 12 d/f) and engineering-works materials.

[0028] Moreover, like a staple fiber nonwoven fabric (A), although the superintendent officer of a staple fiber nonwoven fabric (B) is arbitrary, when using it for the clothes for an operation, a credit cloth, the base fabric of HAPPU material, etc. by the application used, 5 - 150 g/m2 is desirable. If the superintendent officer of a staple fiber nonwoven fabric (B) becomes less than two 5 g/m, since the thickness of a staple fiber nonwoven fabric (B) becomes thin too much like the case of a staple fiber nonwoven fabric (A), handling will be difficult or homogeneity will fall, it is not desirable. On the contrary, since the rigidity of the staple fiber nonwoven fabric (B) itself will become high and flexibility will fall if 150 g/m2 is exceeded, it is not desirable. When using it for the facing of absorptivity goods especially, the superintendent officer of a staple fiber nonwoven fabric (B) has desirable 5 - 50 g/m2. That whose fiber length is 3-30mm can be used

for a staple fiber (B). If the fiber length of a staple fiber (B) is set to less than 3mm, since the loft of a staple fiber nonwoven fabric (B) will fall and apparent density gravity will become high, it is not desirable. On the contrary, since filamentation nature will worsen and homogeneity will fall if it exceeds 30mm, it is not desirable. That whose fiber length is 3-15mm is especially desirable in the good point of a loft and homogeneity. Furthermore, the thing to which crimp was given, and the thing of non-crimp can be used for a staple fiber (B). In a point with a good loft, that [a staple fiber's (B)'s] by which crimp grant was carried out is especially desirable. As crimp, a spiral mold, a zigzag mold, a U character mold, etc. are illustrated, and they are a spiral mold and a U character mold preferably. Moreover, when manufacturing a staple fiber nonwoven fabric (B) using a paper-making method, the staple fiber (B) with which crimp was given must be used. The reason for having to use a crimped staple by the paper-making method is for being inferior and being easy to carry out liquid retaining to the permeability of body fluid, when this approach used water for the medium of the Webb formation, and a loft is lost, and the opening of the nonwoven fabric obtained becomes small and it is used for the facing of absorptivity goods according to a dynamic operation of that medium.

[0029] A staple fiber (B) is a bicomponent fiber which has the thermal melting arrival nature by various combination, such as polyolefine system resin, such as various kinds of polyethylene and polypropylene, polyester system resin, and polyamide system resin. The reason for having used the staple fiber (B) as the thermal melting arrival nature compound staple fiber is for holding the specific structure mentioned later. more than the two-component system, for example, three components, by which a low-melt point point component is formed in a part of fiber front face [at least] with a thermal melting arrival nature compound staple fiber, or four components -- since -- it is the becoming compound staple fiber. However, except for a specific application, two components are desirable, in view of economical efficiency. The resin used for a thermal melting arrival nature compound staple fiber (B) and its combination can use the thermoplastics which was indicated in the case of the staple fiber nonwoven fabric (A), and its combination as it is. However, the selection is performed independently of the case of a staple fiber nonwoven fabric (A). Furthermore, when the resin of three or more components is used, a high-melting and low-melt point point side is defined like the case of a staple fiber nonwoven fabric (A). Moreover, the bicomponent fiber of a sheath-core type, an eccentric sheath-core type, a parallel connected type, a multilayer mold, and a sea-island type can be used for this thermal melting arrival compound staple fiber (B). Moreover, as for the staple fiber (B), the coloring agent, the illuminant-proof, the flame retarder, the antimicrobial agent, etc. may be added by the application. Furthermore, the cross section of a thermal melting arrival nature compound staple fiber (B) may be circular, or you may be an anomaly, and the thermal melting arrival nature compound staple fiber (B) with these cross sections may be a hollow mold, or may not be so.

[0030] The staple fiber nonwoven fabric (B) may be constituted by cotton-mixing of 2 or more sorts by various combination although it differs of thermal melting arrival nature compound staple fiber (B) they are [compound] that from which the combination of resin differs among the thermal melting arrival nature compound staple fibers (B) manufactured by the approach mentioned above, the thing from which a cross-section configuration differs, a hollow mold and a thing without that right, the thing from which fiber length differs, and fineness. Furthermore, a staple fiber nonwoven fabric (B) may be one layer which consists of said thermal melting arrival nature compound staple fibers (B), and may be more than two-layer. When carrying out a staple fiber nonwoven fabric (B) more than two-layer, a staple fiber nonwoven fabric (B) has the desirable thing which made the density gradient give in the thickness direction of a nonwoven fabric. That is, as for staple fiber Webb (B), it is desirable to make a density gradient form and to carry out deposition junction so that a consistency may decrease gradually so that a consistency may increase gradually. Thus, the reason for giving a density gradient to a staple fiber nonwoven fabric (B) is because the permeability of body fluid improves with the property which the consistency of a liquid moves to a part dense from a **** part, and the reversion after penetrating is prevented and it becomes still more suitable for use of the facing of absorptivity goods etc.

[0031] The important thing especially in this invention is a point which the staple fiber nonwoven

fabric (B) to be used makes random and porous one arrange this thermal melting arrival nature compound staple fiber (B) to constitute, and is carrying out accumulation junction. That is, said staple fiber nonwoven fabric (B) consists of these thermal melting arrival nature compound staple fibers (B), and thermal melting arrival nature compound staple fibers are characterized by the crossover angular distribution of the staple fiber contact which are formed by being carried out forming at least 50% of the total number of contacts of a staple fiber nonwoven fabric (B) with the crossed axes angle of 60-90 degrees thermal melting arrival. The percentage (%) with a crossed axes angle of 60-90 degrees was used as a scale of the random nature of a staple fiber nonwoven fabric (B), or porous nature. Moreover, the percentage (%) with a crossed axes angle of 60-90 degrees measured the minimum include angle among four angles in which two staple fibers carry out crossover junction, and are formed, performed 100 or more points of this measurement by having made this into the crossed axes angle, asked for crossover angular distribution, set the total of A and the measured crossed axes angle to M, and asked for the number of the crossed axes angles contained in the crossed axes angle of 60-90 degrees by A/Mx100.

[0032] The reason which the thermal melting arrival nature compound staple fiber which constitutes a staple fiber nonwoven fabric (B) must arrange to random and porous one is for demonstrating the effectiveness of excelling in the penetrable ability of body fluid, when it is used for the facing of absorptivity goods. That is, it is because the staple fiber to constitute has arranged the staple fiber nonwoven fabric (B) obtained using the air RAID method or a paper-making method to random and porous ones, so it is carried out, without body fluid spreading [transparency of body fluid] in the array direction of fiber on a nonwoven fabric by the operation like a capillary tube to the direction of a machine of the nonwoven fabric looked at by the nonwoven fabric by the card method stopping being able to happen easily. Furthermore, since the fiber length of a staple fiber is short enough, fiber has arranged comparatively the staple fiber (B) which constitutes this staple fiber nonwoven fabric (B) in the thickness direction of a nonwoven fabric. For this reason, the staple fiber nonwoven fabric (B) obtained is excellent in cushioning properties, and apparent density gravity fully falls with bulky. It has the operation like a capillary tube of the thickness direction of a nonwoven fabric. And the compound-ized nonwoven fabric of this invention When it is used as facing of the severe absorptivity goods of especially a military requirement, the effectiveness of preventing reversion of the body fluid which the permeability of body fluid, such as urine, sweat, and blood, spot permeability, and a feeling of SARATTO were raised further, and penetrated them is done so.

[0033] The staple fiber nonwoven fabric (B) with the above configurations is the following, and is made and manufactured. That is, a thermal melting arrival nature compound staple fiber (B) and a hydrophilic staple fiber are mixed with cotton, this is opened, and an air RAID nonwoven fabric processing machine is supplied. With an air RAID nonwoven fabric processing machine, filamentation scattering is carried out and the supplied staple fiber is deposited on an uptake conveyor. Multilayer staple fiber Webb (B) who performed this actuation in multistage is introduced into the heating gas style below the melting point of a high-melting component more than the melting point of the low-melt point point component of a thermal melting arrival nature compound staple fiber (B), between staple fibers is joined for the low-melt point point component of a thermal melting arrival nature compound staple fiber (B) by softening or carrying out melting, and a staple fiber nonwoven fabric (B) is obtained. Moreover, nonwoven fabric-ization of a staple fiber (B) may be performed with compound-ization with a staple fiber nonwoven fabric (A) so that it may mention later. That is, after making nonwoven fabric-ization of a staple fiber (B) deposit directly on the staple fiber nonwoven fabric (A) which runs the staple fiber (B) dispersed with the air RAID nonwoven fabric processing machine, or staple fiber Webb (A), it may be performed with compound-ization with a staple fiber nonwoven fabric (A) by carrying out hot blast heat-treatment.

[0034] The staple fiber nonwoven fabric (A) and staple fiber nonwoven fabric (B) which described above the compound-ized nonwoven fabric concerning this invention are formed into at least two-sort compound. Compound-ization of a staple fiber nonwoven fabric (A) and a staple fiber nonwoven fabric (B) may be laminating junction of a staple fiber layer (A) and a staple fiber

nonwoven fabric (B), or may be laminating junction of a staple fiber layer (A) and staple fiber Webb (B). The staple fiber layer (A) said here is a staple fiber nonwoven fabric (A) or staple fiber Webb (A). Junction of the staple fiber layer (A) in compound-izing of a staple fiber nonwoven fabric (A) and a staple fiber nonwoven fabric (B) and a staple fiber layer (B) is performed by softening or carrying out melting in the low-melt point point component of the thermal melting arrival nature compound staple fiber contained in a staple fiber layer (B) (B), i.e., a staple fiber nonwoven fabric, or staple fiber Webb (B). As an example, the embossing roll method, the ultrasonic heating method, the hot blast heating method, etc. are mentioned. Moreover, although compound-ization of a staple fiber nonwoven fabric (A) and a staple fiber nonwoven fabric (B) may be performed by various adhesives and binders, such as hot melt, and there is no limit in the spreading pattern of adhesives or a binder as this exception, little spreading is possible and a spiral pattern is desirable in the point which does not spoil the softness of a compound-ized nonwoven fabric. In a point with an especially good loft, junction of the staple fiber layer (A) in compound-izing of a staple fiber nonwoven fabric (A) and a staple fiber nonwoven fabric (B) and a staple fiber layer (B) has the desirable hot blast heating method. Furthermore, it is also desirable to be selected so that the melting point of each low-melt point point component which a staple fiber layer (A) consists of interweaving of 30% of the weight or more of a thermal melting arrival nature compound staple fiber or a low-melt point point heat welding staple fiber, and is contained in a staple fiber layer (A) and a staple fiber layer (B) may turn into the melting point lower 15 degrees C or more than the melting point of each high-melting component.

[0035] Thus, the reason for selecting the melting point of each component in a staple fiber layer (A) and a staple fiber layer (B) Junction of the staple fiber layer (A) in compound-izing of a staple fiber nonwoven fabric (A) and a staple fiber nonwoven fabric (B) and a staple fiber layer (B) The low-melt point point component of the thermal melting arrival nature compound staple fiber contained in a staple fiber layer (B) (B), i.e., a staple fiber nonwoven fabric, or staple fiber Webb (B) softening or not only carrying out melting but Even if it is the case where softening or carrying out melting were also performed in the low-melt point point component of a staple fiber nonwoven fabric (A), and two or more sorts of thermal melting arrival nature bicomponent fibers are mixed with cotton in a staple fiber layer (A) at cotton-mixing or a staple fiber layer (B) It is because each low-melt point point component can demonstrate the effectiveness of thermal melting arrival and can strengthen further reinforcement of a compound-ized nonwoven fabric and a plane of composition.

[0036] As for the hot blast heat-treatment in this case, it is desirable to be carried out below with the melting point of the component which is a low-melt point point most among the high-melting components of a staple fiber layer (A) and a staple fiber layer (B) more than the melting point of the component which is high-melting most among the low-melt point point components of a staple fiber layer (A) and a staple fiber layer (B). If hot blast heat-treatment is performed under with the melting point of the component of the low-melt point point component of a staple fiber layer (A) and a staple fiber layer (B) which is high-melting most, since junction of the staple fiber layer (A) in compound-izing of a staple fiber nonwoven fabric (A) and a staple fiber nonwoven fabric (B) and a staple fiber layer (B) is performed by not all low-melt point point components, it is not so desirable. On the contrary, if hot blast heat-treatment is performed exceeding the melting point of the component of the high-melting component of a staple fiber layer (A) and a staple fiber layer (B) which is a low-melt point point most, since only a lifting and a heterogeneous compound-ized nonwoven fabric can obtain the damage by heat, contraction or the fall of **, etc., this high-melting component is not desirable. Moreover, when giving inclination to the blended ratio of a density gradient or hydrophilic fiber in the thickness direction of the staple fiber layer (A) of a compound-ized nonwoven fabric, even if a staple fiber layer (A) is dense, it may be good, and may rough-** the side joined to a staple fiber nonwoven fabric (B) according to an application. When giving a density gradient in the thickness direction of the staple fiber layer (B) of a compound-ized nonwoven fabric, similarly, suitably, even if a staple fiber layer (B) is dense, it may be good, and may rough-** the side joined to a staple fiber nonwoven fabric (A) according to an application. Furthermore, a compound-ized nonwoven fabric may use whichever for a table according to an application, laminating junction of a staple fiber

layer (A) or the staple fiber layer (B) can be carried out further, and can make a compound-ized nonwoven fabric three or more layers, and can also use it for the two-layer compound-ized nonwoven fabric obtained as mentioned above. Furthermore, the laminating of the sheets, such as nonwoven fabrics other than the above, a knit fabric, paper, and a film, can also be carried out to the compound-ized nonwoven fabric more than two-layer [above-mentioned]. When especially using for the top sheet or second sheet of absorptivity goods, it is desirable to set a staple fiber nonwoven fabric (B) side as the upstream of the flow of body fluid, and, as for the density gradient in that case, it is desirable to make it dense sequentially from the upstream of the flow of body fluid.

[0037] Although the property of this invention and effectiveness can be demonstrated even if a compound-ized nonwoven fabric makes a staple fiber nonwoven fabric (A) side the upstream of the flow of body fluid and it makes it into the downstream If the staple fiber nonwoven fabric (A) side of a compound-ized nonwoven fabric is especially made into the downstream of the flow of body fluid, since the staple fiber (A) will have arranged in the longitudinal direction of a machine, i.e., direction, of a nonwoven fabric, Body fluid can be substantially diffused in the direction of a machine of a nonwoven fabric, it can distribute effective in the superabsorbency polymer in the absorption layer which exists in the style of [of the flow of body fluid] the bottom, and the so-called horizontal leakage can be prevented. Furthermore, since the staple fiber (A) has arranged this card nonwoven fabric layer (A), i.e., a staple fiber nonwoven fabric, in the longitudinal direction of a machine, i.e., direction, of a nonwoven fabric, it is inferior in the repulsive force over a load in the thickness direction. However, after this penetrates body fluid, the effectiveness of the reversion prevention produced when a load is added to a compound-ized nonwoven fabric is done so. that is, a load adds to the compound-ized nonwoven fabric which penetrated body fluid -- having -- excessive body fluid -- oozing out -- it prevents by a staple fiber nonwoven fabric (A) becoming high density by the load, and holding body fluid harder [which is inferior to the repulsive force over a load in the reversion to produce].

[0038] Moreover, a staple fiber nonwoven fabric (A) is making it specific structure which is mentioned later, and can enrich more a function peculiar to the above-mentioned compound-ized nonwoven fabric. That is, it is that the crossover angular distribution of a contact in which it is contacted or joined and the fiber which constitute a staple fiber nonwoven fabric (A) is formed make at least 50% of the total number of contacts of a nonwoven fabric (A) have with the crossed axes angle of 0-30 degrees. The percentage (%) with a crossed axes angle of 0-30 degrees was used as a scale of the stacking tendency of the fiber of a staple fiber nonwoven fabric (A), or an anisotropy. Moreover, the percentage (%) with a crossed axes angle of 0-30 degrees measured the minimum include angle among four angles in which two staple fibers join [crossover-] or contact [crossover-], and are formed, performed 100 or more points of this measurement by having made this into the crossed axes angle, asked for crossover angular distribution, set the total of A and the measured crossed axes angle to M, and asked for the number of the crossed axes angles contained in the crossed axes angle of 0-30 degrees by A/Mx100.

[0039] However, cautions are required to use a compound-ized nonwoven fabric for the top sheet which contacts especially the direct skin in a staple fiber nonwoven fabric (B) among the parts (a top sheet, second sheet, etc.) which make the upstream of the flow of body fluid and body fluid penetrates in this way. Since the staple fiber which constitutes the staple fiber nonwoven fabric (B) mentioned above arranges in the thickness direction of a nonwoven fabric comparatively and many fiber ends exist, when contacting it to the direct skin, it stimulates the skin and is the cautions to the point which becomes the cause that it can fog. Such a problem can solve a compound-ized nonwoven fabric by making it three or more layers, as described above. That is, the staple fiber nonwoven fabric (B) with which many fiber ends exist in the staple fiber nonwoven fabric (B) side of a compound-ized nonwoven fabric by carrying out laminating junction of the nonwoven fabric further is covered, and it can solve by making the stimulus to the skin mitigate. For example, various nonwoven fabrics other than a staple fiber nonwoven fabric (B) called the card nonwoven fabric containing a span bond nonwoven fabric or a staple fiber nonwoven fabric (A) can be used for the nonwoven fabric which carries out

laminating junction, and the eyes of the various nonwoven fabrics have the desirable range of 5 - 15 g/m2. Since handling is difficult or homogeneity falls when it becomes less than two 5 g/m in case the thickness of the nonwoven fabric which carries out laminating junction becomes thin too much and configuration fiber is made to fix (nonwoven-fabric-izing), or in case the fixed nonwoven fabric which carries out laminating junction is rolled round, the reason for having made eyes into the above-mentioned range is not desirable. On the contrary, if it becomes two or more 15 g/m, it is not desirable in order to check the description or effectiveness of a staple fiber nonwoven fabric (B) which the property of the nonwoven fabric itself which carries out laminating junction was demonstrated, and was mentioned above. Moreover, when using a staple fiber nonwoven fabric (A) for the nonwoven fabric which carries out laminating junction, it is not desirable that you make it a crossed axes angle distributed over said acute angle in order to worsen spot permeability.

[0040] In this invention, especially the mode of desirable compound-izing of a staple fiber nonwoven fabric (A) and a staple fiber nonwoven fabric (B) is laminating junction of a staple fiber layer (A) and staple fiber Webb (B) by the hot blast heating method. The staple fiber layer (A) and staple fiber Webb's (B) laminating junction by the hot blast heating method Direct staple fiber Webb (B) is made to deposit on a staple fiber nonwoven fabric (A) or staple fiber Webb (A). It is carrying out introductory heat treatment and joining a staple fiber nonwoven fabric (A) and a staple fiber nonwoven fabric (B) into the heating gas style below the melting point of a high-melting component, more than the melting point of the low-melt point point component of the thermal melting arrival nature compound staple fiber contained in staple fiber Webb (B). Thus, the laminating junction of a staple fiber layer (A) and staple fiber Webb (B) acquired, Namely, a staple fiber nonwoven fabric (A) or the compound-ized nonwoven fabric by laminating junction of staple fiber Webb (A) and staple fiber Webb (B) Unlike the usual junction structure like laminating junction of a staple fiber nonwoven fabric (A) and a staple fiber nonwoven fabric (B), it sets to a plane of composition. It has structure which staple fiber Webb (B) entered the opening of a staple fiber nonwoven fabric (A) or staple fiber Webb (A), and the pasting up point of mutual staple fibers was formed in three dimension between layers, and the staple fiber of a staple fiber layer (B) arranged in the thickness direction of a nonwoven fabric comparatively. For this reason, an anchor effect arises between the layers of a staple fiber nonwoven fabric (A) and a staple fiber nonwoven fabric (B), and the compound-ized nonwoven fabric obtained by the laminating junction of a staple fiber layer (A) and staple fiber Webb (B) by the hot blast heating method is excellent in the external shear stress expected as facing of absorptivity goods at the time of use, or gestalt [as opposed to / get twisted and / stress] stability.

[0041] Moreover, since the staple fiber (B) which constitutes a staple fiber layer (B) between the layers of a staple fiber nonwoven fabric (A) and a staple fiber nonwoven fabric (B) has arranged in the thickness direction of a nonwoven fabric comparatively, When it excelled in cushioning properties, and apparent density gravity is fully low bulky, and the operation like a capillary tube to the thickness direction of a nonwoven fabric improves further and it uses for the facing of absorptivity goods, it excels in the penetrable ability of body fluid, and spot permeability, and the reversion nature of the transmitted body fluid is made to make it low. Thus, compound-ization of a staple fiber nonwoven fabric (A) and a staple fiber nonwoven fabric (B) is excellent in the gestalt stability at the time of using for the facing of absorptivity goods and the permeability of body fluid, and spot permeability, and its laminating junction of a staple fiber layer (A) and staple fiber Webb (B) by the hot blast heating method is desirable in the point that the reversion nature of the transmitted body fluid is low. Moreover, it also sets to the laminating junction of a staple fiber layer (A) and staple fiber Webb (B) by this hot blast heating method. A staple fiber layer (A) is constituted from interweaving of 30% of the weight or more of a thermal melting arrival nature compound staple fiber, or a low-melt point point heat welding staple fiber. And it is desirable to be selected so that the melting point of the low-melt point point component of a staple fiber layer (B) and the low-melt point point component of a staple fiber layer (B) may turn into 15-degree-C or more low-melt point point from the melting point of each other high-melting component. More than the melting point of the component whose hot blast heat-treatment in this case is also high-melting most among the low-melt point point components of a staple fiber

layer (A) and a staple fiber layer (B) It is desirable to be carried out below with the melting point of the component which is a low-melt point point most among the high-melting components of a staple fiber layer (A) and a staple fiber layer (B). In the laminating junction of staple fiber Webb (A) and staple fiber Webb (B) especially by hot blast heating, since nonwoven-fabric-izing and compound-izing of staple fiber Webb (A) and staple fiber Webb (B) are performed to coincidence, this serves as a requirement.

[0042] Hereafter, the example of the manufacturing method of the compound-ized nonwoven fabric by the laminating junction of a staple fiber layer (A) and staple fiber Webb (B) concerning this invention is explained. First, that in which a thermal melting arrival nature staple fiber and other fiber carried out mixed **** is conventionally supplied to a well-known carding machine, and uniform Webb (A) spun by the predetermined operation from this is obtained. Then, since staple fiber Webb (A) is fixed, thermocompression bonding processing is partially carried out between the heated engraved roll and a smooth roll, and staple fiber Webb (A) is conveyed by the air RAID nonwoven fabric processing machine as a staple fiber nonwoven fabric (A). If a staple fiber layer (A) is used here with staple fiber Webb (A), staple fiber Webb (A) will be conveyed by the air RAID nonwoven fabric processing machine as it is, without performing partial thermocompression bonding between an engraved roll and a smooth roll. Next, being drawn in by the suction blower after filamentation scattering is carried out by the air RAID nonwoven fabric processing machine, the staple fiber (B) group used as a staple fiber layer (B) accumulates on the staple fiber layer (A) conveyed, forms the layered product of a staple fiber layer (A) and staple fiber Webb (B), and is conveyed by the hot blast fired dryer. More than the melting point of the low-melt point point component of the thermal melting arrival nature compound staple fiber with which only staple fiber Webb (B) is contained in a staple fiber layer (A) and both staple fiber Webb's (B) layers, below with the melting point of a high-melting component, the layered product of the staple fiber layer (A) conveyed by the hot blast fired dryer and staple fiber Webb (B) is heat-treated by the hot blast fired dryer, and is rolled round as a compound-ized nonwoven fabric.

[0043] the facing which this invention becomes from a compound-ized nonwoven fabric and the absorptivity goods which consist of an absorber holding body fluid, for example, a sanitary napkin, a disposable diaper, the pad for incontinentia, and a vaginal discharge -- a sheet etc. is offered. The facing said by this invention means the thing containing the member which forms the front face of absorptivity goods, such as a top sheet, a backseat, and side gathers, the wrapping material of an absorber, a member like a second sheet, etc. The absorptivity goods of this invention are characterized by using a compound-ized nonwoven fabric for a top sheet or a second sheet at least among facing. As an example of this invention, if it explains in more detail, a sanitary napkin 1 consists of the top sheet 2 of liquid permeability, the backseat 4 of liquid impermeability, and the absorber 5 that carries out absorption maintenance of the body fluid, and the absorber 5 is arranged between the top sheet 2 and the backseat 4 by Figs. 1 and 2. Furthermore, the absorber 5 is wrapped in the wrapping material 9. Moreover, a glue line 12 is formed in the side in contact with the panties of a backseat 4, and the release liner 13 is arranged at it so that this glue line 12 may be covered. Moreover, the second sheet 3 of liquid permeability may be arranged between the top sheet 2 and the body fluid diffusion layer 11. The body fluid diffusion layer 11 may be arranged between an wrapping material 9 and an absorber 5. Although a sanitary napkin 1 can be formed in various configurations, in almost all cases, it has the shape of a rectangle about and the edge section is respectively formed as the radii configuration section 6. In almost all cases, although an absorber 5 is generally smaller than a backseat 4 and it can form in various configurations, it has the shape of a rectangle about, and the edge of the absorber section corresponds to the configuration of a backseat 4, and may be formed as the radii configuration section 7. In consideration of the fit nature at the time of wearing, the longitudinal flank 10 of the absorber 5 as an absorption member and the longitudinal flank 8 of the absorptivity goods 1 may make it curve inside, and may form a central part narrowly a little.

[0044] The absorptivity goods of this invention are characterized by using the compound-ized nonwoven fabric of this invention for the top sheet 2 or the second sheet 3 at least among the

facing of absorptivity goods with the above-mentioned configuration. Moreover, both the top sheet 2 and the second sheet 3 can also use what consisted of compound-ized nonwoven fabrics of this invention. As for the compound-ized nonwoven fabric of this invention, a staple fiber nonwoven fabric (A) and a staple fiber nonwoven fabric (B) are compound-ized. If a backseat 4 fully has liquid impermeability, there will be especially no limit, for example, a knit fabric, a nonwoven fabric, a film, etc. will be mentioned as the example. There is a sheet of steamy permeability which makes a steam penetrate by the liquid impermeability which added and extended fillers, such as a calcium carbonate, to thermoplastics as an example. It is a thing with the desirable feel near the skin, for example, the above-mentioned film, a nonwoven fabric, or composite with a knit fabric, and composite with the nonwoven fabric, film, or knit fabric of said compound-ized nonwoven fabric and a compound-ized nonwoven fabric, and others may be used.

[0045] The absorber 5 makes the subject hydrophilic fiber and a high-polymer absorbent (Super Absorbent Polymer). Rayon, cuprammonium rayon, acetate, Vinylon, nylon, protein and acrylonitrile copolymerization yarn, cotton, wool, silk, hemp, pulp, etc. are mentioned, and preferably, although it is cellulosic fibers, such as rayon, cuprammonium rayon, acetate, and pulp, substantially, in almost all cases, pulp is used for the hydrophilic fiber said here. If pulp fiber is an object used for the absorber from the former, there will be especially no limit, but when grinding, a laminating, compression processing, etc. are taken into consideration, as for the mean fiber length of the pulp fiber, it is desirable that it is usually in the range of 0.8-5mm.

[0046] Although it will not be restricted especially if a high-polymer absorbent is an object used from the former, as for the saturation absorbed amount of a high-polymer absorbent, it is desirable that they are 25 or more g/g, and it can use the thing of the shape of fibrous and a particle. In addition, a saturation absorbed amount introduces 1g of high-polymer absorbents into the tea bag made of nylon of 250 meshes, makes this immersed into the 0.9-% of the weight brine of an excessive amount for 1 hour, and is calculated as increment weight after performing a ridge for 15 minutes. When a high-polymer absorbent is a particle-like, it is desirable for the particle diameter to be 100-800 micrometers. As a presentation of a concrete high-polymer absorbent, sodium polyacrylate, an acrylic-acid vinyl alcohol copolymer, a sodium-polyacrylate bridge formation object, a starch-acrylic-acid graft copolymer, an isobutylene-maleic-anhydride copolymer or its saponification object, a polyacrylic acid potassium, polyacrylic acid caesium, etc. are suitable. The rate of combination of a high-polymer absorbent is 5 - 10% of the weight of the range except for the case of being special, to the AUW of an absorber, and these high-polymer absorbents are independent, or it can be used by two or more sorts of mixing. Moreover, it is also desirable to mix with cotton a thermal melting arrival nature compound staple fiber to an absorber. 0 - 60% of the fiber AUW of the blended ratio of a thermal melting arrival nature compound staple fiber used for an absorber is desirable. The network which the thermal melting arrival nature compound staple fiber joined to the whole absorber by heat-treating a thermal melting arrival nature compound staple fiber is formed, and the reasons for mixing with cotton a thermal melting arrival nature compound staple fiber are the compression and shear stress by motion of a wearing person, and for getting twisted, demonstrating the effectiveness of gestalt stability to stress, and preventing the fall of the body fluid absorptivity ability of an absorber.

[0047] Generally the absorber is covered with the wrapping material 9 for configuration maintenance, the so-called powder omission prevention, etc. An wrapping material 9 is constituted by the subject in hydrophilic staple fibers, such as rayon, cuprammonium rayon, acetate, Vinylon, nylon, protein and acrylonitrile copolymerization yarn, cotton, wool, silk, hemp, and pulp, and preferably, although it is cellulosic fibers, such as rayon, cuprammonium rayon, acetate, and pulp, substantially, in almost all cases, pulp is used. A thermal melting arrival nature compound staple fiber can also be mixed with cotton to an wrapping material 9. 0 - 60% of the fiber AUW of the blended ratio of a thermal melting arrival nature compound staple fiber used for an absorber is desirable. The reason nil why cotton-mixing of a thermal melting arrival nature compound staple fiber is desirable The network which the thermal melting arrival nature compound staple fiber joined to the whole absorber by heat-treating a thermal melting arrival nature compound staple fiber like the case of an absorber is formed. The compression and shear

stress by motion of a wearing person, and in order to get twisted, to demonstrate the effectiveness of gestalt stability to stress and to prevent the fall of body fluid absorptivity ability, When carrying out welding junction furthermore by the top sheet 2, the facing and the heating roller method of backseat 4 grade, the ultrasonic heating method, etc., it is because a firm join is formed and it excels in the gestalt stability as the whole absorptivity goods. What was indicated as a thermal melting arrival nature compound staple fiber used for an absorber and an wrapping material in the case of the staple fiber (B) used for the compound-ized nonwoven fabric of facing can be used. Furthermore, a thermal melting arrival nature compound staple fiber may be a thermal melting arrival nature compound staple fiber which consists of two or more components, 3 [for example,], or 4 components. However, if economical efficiency is taken into consideration, except for a special application, two components are enough. The cut length of the thermal melting arrival nature compound staple fiber used for an absorber and an wrapping material is the range which can be formed in the shape of a sheet, and although he is not restricted especially, he is 3-90mm preferably.

[0048] Furthermore, it is also desirable to use the absorption layer with which the wrapping material 9 and the absorber 5 were united instead of an wrapping material 9 and an absorber 5. 10 - 60% of the weight of the above-mentioned thermal melting arrival nature compound staple fiber is put between the above-mentioned hydrophilic staple fiber with the nonwoven fabric which mixed with cotton, junction unification is carried out, and the absorption layer by which the junction unification of an wrapping material 9 and an absorber 5 here was carried out really cuts out the above-mentioned absorber in a desired gestalt, for example, is manufactured as follows. That is, the absorption layer by which the junction unification of an wrapping material 9 and the absorber 5 was carried out makes the above-mentioned hydrophilic staple fiber carry out filamentation scattering of what mixed with cotton 0 - 60% of the weight of the above-mentioned thermal melting arrival nature compound staple fiber, and it is made to deposit it using the air RAID method. After carry out filamentation scattering of the mixture of the above-mentioned hydrophilic fiber and the above-mentioned high-polymer absorbent, making it deposit on this continuously, carrying out filamentation scattering of what mixed with cotton 10 - 60% of the weight of the above-mentioned thermal melting arrival nature compound staple fiber to the above-mentioned hydrophilic staple fiber, making it deposit on this further and carrying out junction unification by heat treatment, it really judges and is obtained. Junction in unification of an wrapping material 9 and an absorber 5 is performed by softening or carrying out melting in the low-melt point point component of the thermal melting arrival nature compound staple fiber contained in staple fiber Webb, and the embossing roll method, the ultrasonic heating method, the hot blast heating method, etc. are mentioned as an example. In a point with an especially good loft, the hot blast heating method is desirable. Moreover, it is also desirable to mix with cotton the above-mentioned thermal melting arrival nature compound staple fiber to the absorber 5 of an absorption layer with which the above-mentioned wrapping material 9 and the absorber 5 were unified because of more powerful junction. In case such an absorption layer is processed to absorptivity goods, there is little powder omission from an absorber and it is a desirable mode in the point which is easy to deal with it.

[0049] Generally, absorptivity goods will absorb a lot of body fluid in the point of contacting the outlet of body fluid, and an absorber will be in a saturation state. Body fluid makes a radial produce the so-called horizontal leakage which gets wet from the nearest part on breadth and foot from this point. The body fluid diffusion layer 11 can be made to intervene between the top sheet 2 and an absorber 5 as one of the desirable cures which aims at this horizontal leakage prevention. The body fluid diffusion layer 11 carries out absorption diffusion of the body fluid quickly, and raises the comprehensive absorbed amount of body fluid by making body fluid absorb with the whole absorber. A knit fabric, the non-woven textile aggregate, a porous film, etc. are illustrated by the body fluid diffusion layer 11, and the non-woven textile aggregate is substantially common to it. The non-woven textile aggregates said here are nonwoven fabrics, such as a staple fiber nonwoven fabric which fabricated fiber aggregates, such as staple fiber Webb, and continuous glass fiber fleece, a sliver, and these to blanket-like, and a continuous glass fiber nonwoven fabric, a melt-blown nonwoven fabric. As for the body fluid diffusion layer

11, in the point of making the good conveyance nature and the diffusibility of body fluid discovering, it is desirable that it is a hydrophilic property. The body fluid diffusion layer 11 makes hydrophilization agents, such as a surfactant, apply or adhere to the front face, and can be processed to a hydrophilic property. When the body fluid diffusion layer 11 consists of thermoplastics especially, hydrophilization agents, such as hydrophilization resin and a surfactant, are scoured to this thermoplastics, and the body fluid diffusion layer 11 can be beforehand made into a hydrophilic property by fabricating fiber or a film.

[0050] As hydrophilic resin, ether, such as ethylene glycol, the homopolymer of vinyl alcohol and this ethylene or a copolymer with a propylene, a polyether block amide copolymer, etc. can be illustrated, and they are a thermoplastic polyethylene glycol (trade name AKUA coke; Sumitomo Seika Chemicals Co., Ltd. make), an ethylene-vinylalcohol copolymer (trade name Eval; Kuraray Co., Ltd. make), and a polyether block amide copolymer (product made from trade name PEBAX;ATOCHEM) as an example. The appending rate in the case of scouring these hydrophilic-properties resin to the thermoplastics which serves as a subject (% of the weight) has 20 - 100 desirable % of the weight, and it chooses suitably and is more independent than the above-mentioned hydrophilization resin, or can add it as two or more sorts of mixture. Moreover, as a surface active agent, nonionic surface active agents, such as cationic surface active agents, such as anionic surface active agents, such as fatty alcohol sulfate, alkylbenzene sulfonates, and higher-alcohol phosphate, an alkylamine salt, and the 4th class amine salt, or polyoxyethylene alkyl ether, polyoxyethylene alkyl ester, and polyhydric-alcohol alkyl ester, can be illustrated. The appending rate in the case of scouring these surfactants to the thermoplastics which serves as a subject (% of the weight) has 0.05 - 10.0 desirable % of the weight, and it chooses suitably and is more independent than the above-mentioned surfactant, or can add it as two or more sorts of mixture. Furthermore, hydrophilization agents, such as a surfactant, can also be applied or adhered to the front face of the fiber which scoured hydrophilization agents, such as hydrophilization resin and a surfactant, or a film. Moreover, the second sheet 3 which may be installed between the top sheet 2 and the body fluid diffusion layer 11 can give cushioning properties, can give the miscellaneous function which will distribute or diffuse body fluid to some extent in advance by the time body fluid reaches to a body fluid diffusion layer, or can prevent relapsing into a skin side in the body fluid absorbed to the absorber.

[0051] A staple fiber or continuous glass fiber can be used for the fiber which constitutes the knit fabric used for the body fluid diffusion layer 11, and the non-woven textile aggregate, and the fineness can use the object of 0.5 - 18 d/f for it. Since the fall of the stringiness by the high-speed spinning for maintaining productivity as the fineness of fiber is less than 0.5 d/f, and the fall of the productivity for maintaining stringiness take place, it is not desirable. Conversely, if fineness exceeds 18 d/f, since the non-woven textile aggregate which is rich in flexibility by the rigidity of fiber becoming high will not be obtained, it is not desirable. Moreover, the superintendent officer of the non-woven textile aggregate has desirable 5 - 150 g/m2. Since handling will be difficult or homogeneity will fall when thickness becomes thin too much and fabricates on absorptivity goods if the superintendent officer of the non-woven textile aggregate becomes less than two 5 g/m, it is not desirable. On the contrary, since the rigidity of the non-woven textile aggregate will become high and flexibility will fall if 150g/m2 is exceeded, it is not desirable. What was indicated as fiber which constitutes a knit fabric and the non-woven textile aggregate in the case of the staple fiber (A) used for the compound-ized nonwoven fabric of facing can be used. Furthermore, when fiber is thermoplasticity, fiber may be fiber which consists of one component, and may be a bicomponent fiber which consists of two or more components, for example, three components, or four components. However, if economical efficiency is taken into consideration, except for a special application, two components are enough.

[0052] The thing to which crimp was given, and the thing of non-crimp can be used for the fiber which constitutes a knit fabric and the non-woven textile aggregate. A loft is good and that [fiber's] by which crimp grant was carried out is especially desirable in the point of excelling in the lowness of reversion nature. As crimp, a spiral mold, a zigzag mold, a U character mold, etc. are illustrated, and they are a spiral mold and a U character mold preferably. Moreover, the bicomponent fiber of a sheath-core type, an eccentric sheath-core type, a parallel connected

type, a multilayer mold, and a sea-island type can be used for the fiber which constitutes a knit fabric and the non-woven textile aggregate. Moreover, as for fiber, the coloring agent, the antimicrobial agent, etc. may be added for design nature or functional grant. Furthermore, the cross section of fiber may be circular or you may be an anomaly, and the fiber with these cross sections may be a hollow mold, or may not be so. In the point of making the good conveyance nature and the diffusibility of body fluid discovering especially, as for the cross section of fiber, it is desirable that it is an anomaly, and, as for whenever [variant / of the cross section], it is desirable that it is 1.3 or more. In addition, whenever [variant] is called for by L/(2root (piS)), when the cross section of L and variant yarn is set to S for the perimeter of variant yarn.
[0053] The knit fabric and the non-woven textile aggregate which are used as a body fluid diffusion layer That from which fiber length differs with continuous glass fiber or a staple fiber, and a staple fiber among the fiber mentioned above, That from which the combination of resin differs in the case of a compound die or a single mold, and a compound die, That they furthermore are not thermal melting arrival nature or thermal melting arrival nature in the case of [whose] a compound die, the thing from which, as for the case of a single mold, resin differs, The thing which added additives, such as the thing and hollow mold with which whenever [cross-section configuration or variant] differ or a thing without that right, a hydrophilic agent, and an antimicrobial agent, or a thing without that right, It may be constituted by cotton-mixing of two or more sorts of fiber by various combination although it differs they are [cotton-mixing] that from which an additive differs, the thing from which fiber length differs, and fineness, or interweaving. Furthermore, the knit fabric which is a body fluid diffusion layer, and the non-woven textile aggregate may be monolayers which consist of above-mentioned fiber, and may be more than two-layer. The body fluid diffusion layer 11 is introduced between the top sheet 2 and an absorber 5. When the absorber 5 is covered with the wrapping material 9, the body fluid diffusion layer 11 may be introduced between the top sheet 2 and an wrapping material 9, and may be introduced between an wrapping material 9 and an absorber 5. In the point of avoiding the blinding of the body fluid diffusion layer 11 at the time of junction by hot melt adhesive etc., it is especially desirable to introduce between an wrapping material 9 and an absorber 5.
[0054] As modes other than sanitary napkin 1 shown in drawing 1 and 2 in this invention, what equipped the sanitary napkin with one pair of wings, one pair of side gathers, or both of those is desirable. A wing may extend and form the top sheet 2 and a backseat 4 from near the center of the absorptivity goods straight side flank 8, may make it join near the center of the absorber straight side flank 8, and may form the top sheet 2 and members other than backseat 4. At the time of use, a wing is turned up under panties, as it wraps in panties, it is equipped with it, and it is offered by at least two purposes. The 1st purpose is constituting the barrier of a duplex especially in the edge of panties, it is preventing the dirt of the wearing person by body fluid, such as blood, and panties, and the 2nd purpose is fixing to a proper location by the glue line allotted to the panties side front face of a wing. Side gathers are in the condition of the absorber straight side flank 8 which projected above the top sheet 2 inside a little, or folded up the lobe inside, and are formed along with the longitudinal direction of absorptivity goods. Side gathers are liquid impermeability like a backseat 4, in order to be provided for horizontal leakage prevention of body fluid and to achieve this function.
[0055] Junction between each part material, such as the top sheet 2, the second sheet 3, a backseat 4, an wrapping material 9, an absorber 5, the body fluid diffusion layer 11, a wing, and side gathers, is performed by welding junction of hot melt adhesive, other adhesives, a binder or a heating roller method, the ultrasonic heating method, etc. Moreover, hot melt adhesive, other adhesives, and a binder are used for the glue line 12 allotted to the backseat 4 or the glue line allotted to the panties side front face of a wing. The glue line 12 is covered with the release liner 13 for protection of a glue line 12 etc.
[0056]
[Function] The compound-ized nonwoven fabric concerning this invention is a compound-ized nonwoven fabric to which the staple fiber nonwoven fabric (A) and the staple fiber nonwoven fabric (B) were joined. Said staple fiber nonwoven fabric (B) It is the thermal melting arrival nature compound staple fiber which consists of thermoplastics of at least two sorts of high-

melting components, and a low-melt point point component. And these thermal melting arrival nature compound staple fibers were carried out thermal melting arrival, and the crossover angular distribution of the staple fiber contact formed form at least 50% of the total number of contacts of a staple fiber nonwoven fabric (B) with the crossed axes angle of 60-90 degrees. Namely, the random nature of the staple fiber nonwoven fabric (B) which constitutes a compound-ized nonwoven fabric is high, and further, this staple fiber nonwoven fabric (B) was obtained using the air RAID method, and since the fiber length of the staple fiber (B) to constitute is short enough, fiber has arranged it in the thickness direction of a nonwoven fabric comparatively. Therefore, apparent density gravity is fully falling with bulky, and it is hard to make liquid retaining of the compound-ized nonwoven fabric concerning this invention harder [to which the operation like a capillary tube, the longitudinal direction of a machine, i.e., direction, of a nonwoven fabric, cannot take place easily], and it is excellent in the operation like a capillary tube to the thickness direction of a nonwoven fabric.

[0057] Furthermore, the manufacturing method of the compound-ized nonwoven fabric concerning this invention Carrying out filamentation scattering of thermal melting arrival nature compound staple fiber Webb (B) who consists of thermoplastics of at least two sorts of high-melting components, and a low-melt point point component by the air RAID method After depositing on the staple fiber layer (A) in which it comes to accumulate a staple fiber, it carries out by heat-treating below with the melting point of a high-melting component more than the melting point of the low-melt point point component of the thermoplastics contained in staple fiber Webb (B) who deposited. For this reason, the compound-ized nonwoven fabric by laminating junction of this manufacturing method (A), i.e., a staple fiber layer, and staple fiber Webb (B) Unlike the usual junction structure like laminating junction of a staple fiber nonwoven fabric (A) and a staple fiber nonwoven fabric (B), it sets to a plane of composition. Staple fiber Webb (B) enters the opening of Webb for a staple fiber layer (A) (A), i.e., a staple fiber nonwoven fabric, or staple fiber Webb (A). It has structure which the pasting up point of a staple fiber (A) and a staple fiber (B) was formed in three dimensions, and the staple fiber (B) arranged in the thickness direction of a nonwoven fabric comparatively. Therefore, the compound-ized nonwoven fabric by this manufacturing method is excellent in the anchor effect between the layers of a staple fiber nonwoven fabric (A) and a staple fiber nonwoven fabric (B). moreover -- and since the staple fiber (B) has arranged in the thickness direction of a nonwoven fabric comparatively between the layers of a staple fiber nonwoven fabric (A) and a staple fiber nonwoven fabric (B), apparent density gravity is still lower bulky, and the operation like a capillary tube to the thickness direction of a nonwoven fabric is improving.

[0058]

[Example] Although the example which evaluated the compound-ized nonwoven fabric concerning this invention as facing of absorptivity goods hereafter is explained in full detail, this invention is not limited to these. Before explaining an example in full detail, the definition and measuring method of the physical-properties value of a compound-ized nonwoven fabric etc. concerning this invention are explained.

[0059] (Superintendent officer) What broke the weight of a nonwoven fabric by area and was expressed with the weight per two (g) 1m of nonwoven fabrics.

(Shear strength) When it was used as facing of absorptivity goods, the shear stress expected and gestalt [as opposed to / get twisted and / stress] stability were evaluated as shear strength. The compound-ized nonwoven fabric was cut in width of face of 5cm, and magnitude with a die length of 15cm, the staple fiber layer (A) and the staple fiber layer (B) were made to exfoliate die length of 6.5cm from the both ends of a longitudinal direction, and the sample from which only 2cm of centers became a compound-ized nonwoven fabric was prepared. The tension test was performed until the edge of the longitudinal direction of a sample has held the staple fiber layer (A), the edge of that opposite side has held the staple fiber layer (B) and it fractured this sample using the fixed-speed tension tester. That to which **, the staple fiber layer (A), and the staple fiber layer (B) carried out layer separation of that to which the fracture condition of this fractured sample is observed, and O, the staple fiber layer (A), and the staple fiber layer (B) have not carried out layer separation of what carried out ingredient destruction clearly clearly

was made into x, and it expressed as shear strength.
(Surface aesthetic property) The feel trial by ten monitors estimated feels, such as the touch, as surface aesthetic property. The monitor grasped the sample with the finger, judged whether it would be sensed that it is soft or aesthetic property is good, and added the test method to the sample judged as it being soft or aesthetic property being good by one point / one person.
(Apparent density gravity) the time of setting thickness at the time of **** to 0.1Dcm(s) for the load of 2.0 g/cm2 in the range of 3.5cmphi of a sample, and making the superintendent officer of a sample into Mx10-4 g/cm2 using the DEJISHIKKUNESUTE star of Oriental energy machine incorporated company, -- apparent density gravity -- M/(Dx1000) -- it is computed by the formula and the unit is g/cm3.
(Transmission rate) The permeability of a compound-ized nonwoven fabric was evaluated as a transmission rate. Tissue was put on the absorber separated from the commercial paper diaper. It put so that a sample might besides become level, and the cylinder whose thickness is 4mm and whose weight is 50g in 50mmphi was further put on this. Time amount after throwing in a 50 cc physiological saline at a stretch and throwing it in in this cylinder until it is absorbed by the sample was measured, and it considered as the transmission rate.
(Blot nature) It bled and spot permeability was evaluated as a sex. After measuring a transmission rate, distance from which the boundary where the trace of the physiological saline which spread in the sample faces each other serves as the longest was set to L, it bled and the value acquired by (L-50) / 50 was expressed as a sex.
(Solution retention) A feeling of SARATTO was evaluated as solution retention for convenience, although it was organic-functions evaluation. When the weight of the sample after bleeding with a transmission rate and evaluating a sex was measured, the value was set to X and weight when supplying a sample to a dryer and removing moisture was set to Y, the value acquired by (X-Y) / Yx100 was made into solution retention.
(Reversion nature) When it was left for 3 minutes after measuring a transmission rate, a filter paper was put on the sample on an absorptivity sheet and a 5kg load was added for 30 seconds, the weight of the physiological saline which the filter paper sucked up was expressed as reversion nature.
(Random nature) About the staple fiber layer (A) of a compound-ized nonwoven fabric, and (B), two staple fibers measured the minimum include angle among four angles formed by carrying out crossover junction (there being also crossover contact in (A)), and made this the crossed axes angle. 100 or more points of this measurement were performed, and it asked for crossover angular distribution, and when the total of A and the measured crossed axes angle was set to M for the number of the crossed axes angles contained in the crossed axes angle of 60-90 degrees, the value acquired by A/Mx100 was expressed as random nature.
[0060] (Example 1) The polypropylene staple fiber of the fineness of 2 deniers, 38mm of cut length, and zigzag mold crimp was prepared, and the parallel card machine was supplied. 12g of eyes/and staple fiber Webb (A) of m2 were obtained. It introduced into the point bond processing machine constituted with the concavo-convex roll which heated this staple fiber Webb (A) at 145 degrees C, and a smooth roll, and thermocompression bonding processing was performed. This staple fiber nonwoven fabric (A) was supplied to the uptake conveyor of the Ayr RAID nonwoven fabric processing machine. The thermal melting arrival nature compound staple fiber (B) which used the fineness of 2 deniers and polypropylene resin of 10mm of cut length as the heart component, used high-density-polyethylene resin as the sheath component, and had the spiral crimp of an eccentric sheath-core mold cross section was opened, and the air RAID nonwoven fabric processing machine was supplied. Filamentation scattering of the supplied staple fiber (B) was carried out with the air RAID nonwoven fabric processing machine, it was made to deposit on said staple fiber nonwoven fabric (A) supplied to the uptake conveyor, and a staple fiber nonwoven fabric (A) and staple fiber Webb's (B) laminated material were obtained. In addition, staple fiber Webb's (B) superintendent officer was taken as 12 g/m2. This staple fiber nonwoven fabric (A) and staple fiber Webb's (B) laminated material were introduced into the 138-degree C heating gas style, melting of the high-density-polyethylene resin which is the low-melt point point component of a thermal melting arrival nature compound staple fiber (B) was carried out,

between staple fibers (B) and between the layer of a staple fiber layer (A) and a staple fiber layer (B) were joined, and the compound-ized nonwoven fabric was obtained. The obtained compound-ized nonwoven fabric was used as a top sheet of the facing of the napkin for arrangement. It was good, and there was also little liquid return and absorptivity was suitable for it on absorptivity goods.

[0061] (Example 2) The thermal melting arrival nature compound staple fiber (A) which used the polypropylene resin of the fineness of 2 deniers and 38mm [of cut length] ** as the heart component, used high-density-polyethylene resin as the sheath component, and had the spiral crimp of an eccentric sheath-core mold cross section was prepared. Said thermal melting arrival nature compound staple fiber (A) was supplied to the parallel card machine, and staple fiber Webb (A) of eyes 12 g/m2 was obtained. This staple fiber Webb (A) was supplied to the uptake conveyor of the Ayr RAID nonwoven fabric processing machine. The thermal melting arrival nature compound staple fiber (B) which carried out the sheath component of a heart component and the high-density-polyethylene resin for the fineness of 2 deniers and polypropylene resin of 10mm of cut length, and had the spiral crimp of an eccentric sheath-core mold was opened, and the air RAID nonwoven fabric processing machine was supplied. Filamentation scattering of the supplied staple fiber (B) was carried out with the air RAID nonwoven fabric processing machine, it was made to deposit on said staple fiber Webb (A) who supplied the uptake conveyor, and the laminated material of staple fiber Webb (A) and staple fiber Webb (B) was obtained. In addition, staple fiber Webb's (B) superintendent officer was taken as 12 g/m2. The laminated material of this staple fiber Webb (A) and staple fiber Webb (B) was introduced into the 138-degree C heating gas style, melting of the high-density-polyethylene resin which is the low-melt point point component of a thermal melting arrival nature compound staple fiber (A) and (B) was carried out, between [of a staple fiber nonwoven fabric (A) and (B)] staple fibers and between the layer of a staple fiber layer (A) and a staple fiber layer (B) were joined, and the compound-ized nonwoven fabric was obtained. The obtained compound-ized nonwoven fabric was used as a top sheet of the facing of the napkin for arrangement. It was good, and there was also little liquid return and absorptivity was suitable for it on absorptivity goods.

[0062] (Example 3) Cut length of a staple fiber (B) was set to 5mm, and also the compound-ized nonwoven fabric was manufactured on the same conditions as an example 2. The obtained compound-ized nonwoven fabric was used as a second sheet of the facing of the napkin for arrangement. It was good, and there was also little liquid return and absorptivity was suitable for it on absorptivity goods.

[0063] (Example 4) Cut length of a staple fiber (B) was set to 30mm, and also the compound-ized nonwoven fabric was manufactured on the same conditions as an example 2. The obtained compound-ized nonwoven fabric was used as a second sheet of the facing of the napkin for arrangement. It was good, and there was also little liquid return and absorptivity was suitable for it on absorptivity goods.

[0064] (Example 5) Cut length of a staple fiber (A) was set to 51mm, cut length mixed with cotton 45mm rayon 30% of the weight by 3 deniers in the staple fiber layer (A), and also fineness manufactured the compound-ized nonwoven fabric on the same conditions as an example 3 in it. The obtained compound-ized nonwoven fabric was used as the top sheet and second sheet of facing of the napkin for arrangement. It was good, and there was also little liquid return and absorptivity was suitable for it on absorptivity goods.

[0065] (Example 6) In the staple fiber layer (A), cut length mixed with cotton 45mm rayon 70% of the weight by 3 deniers, and also fineness manufactured the compound-ized nonwoven fabric on the same conditions as an example 5. The obtained compound-ized nonwoven fabric was used as the top sheet and second sheet of facing of the napkin for arrangement. It was good, and there was also little liquid return and absorptivity was suitable for it on absorptivity goods.

[0066] (Example 1 of a comparison) The staple fiber (A) which consists of fineness of 2 deniers and polypropylene resin of 38mm of cut length was prepared. Said staple fiber (A) was supplied to the parallel card machine, and staple fiber Webb (A) of eyes 12 g/m2 was obtained. It introduced into the point bond processing machine constituted with the concavo-convex roll which heated this staple fiber Webb (A) at 145 degrees C, and a smooth roll, and

thermocompression bonding processing was performed. This staple fiber nonwoven fabric (A) was supplied to the uptake conveyor of the Ayr RAID nonwoven fabric processing machine. In heat welding nature compound (staple fiber B) (this invention which uses the polypropylene resin of the fineness of 2 deniers, 38mm of cut length, and zigzag mold crimp as a heart component, and uses high-density-polyethylene resin as a sheath component, although it corresponds to a thermal melting arrival nature compound staple fiber (A), in order to distinguish from a staple fiber nonwoven fabric (A), introductory opening of (having considered as B)) was carried out at the parallel roller-card processing machine, and the superintendent officer got staple fiber Webb (B) of 12 g/m2. After carrying out the laminating of this staple fiber Webb (A) and staple fiber Webb (B), it introduced into the 138-degree C heating gas style, melting of the high-density-polyethylene resin which is the low-melt point point component of a thermal melting arrival nature compound staple fiber was carried out, staple fiber Webb (A), between [of (B)] staple fibers, and between the layer of a staple fiber nonwoven fabric (A) and a staple fiber nonwoven fabric (B) were joined, and the compound-ized nonwoven fabric was obtained.

[0067] (Example 2 of a comparison) The staple fiber (A) was used as the thermal melting arrival nature compound staple fiber (A) which uses polypropylene resin as a heart component and uses high-density-polyethylene resin as a sheath component, and the compound-ized nonwoven fabric was obtained like the example 2 except processing a staple fiber (B) by the random webber method.

[0068]

[Table 1]

			実施例 1	実施例 2	実施例 3	実施例 4	実施例 5	実施例 6	比較例 1	比較例 2
短繊維不織布A	熱融着複合繊維	繊維種別	非複合型	熱融着複合型	熱融着複合型	熱融着複合型	熱融着複合型	熱融着複合型	非複合型	熱融着複合型
		複合ﾀｲﾌﾟ	−	偏心芯鞘型	偏心芯鞘型	偏心芯鞘型	偏心芯鞘型	偏心芯鞘型	−	偏心芯鞘型
		捲縮ﾀｲﾌﾟ	ジグザク型	螺旋型	螺旋型	螺旋型	螺旋型	螺旋型	ジグザグ型	螺旋型
		使用樹脂	PP	PP／PE	PP／PE	PP／PE	PP／PE	PP／PE	PP	PP／PE
		ﾃﾞﾆｰﾙ×ｶｯﾄ長	2d×38mm	2d×38mm	2d×38mm	2d×38mm	2d×51mm	2d×51mm	2d×38mm	2d×38mm
	親水性繊維	混率(重量%)	0	0	0	0	30	70	0	0
		素材	−	−	−	−	レーヨン	レーヨン	−	−
		ﾃﾞﾆｰﾙ×ｶｯﾄ長	−	−	−	−	3d×45mm	3d×45mm	−	−
	目付(g/m²)		12	12	12	12	12	12	12	12
	ランダム性(%)		31	40	12	37	41	32	35	36
	交差角0〜30度(%)		35	25	52	29	23	33	30	31
短繊維不織布B	使用樹脂		PP／PE	PP／PE	PP／PE	PP／PE	PP／PE	PP／PE	PP／PE	PP／PE
	複合ﾀｲﾌﾟ		偏心芯鞘型	偏心芯鞘型	偏心芯鞘型	偏心芯鞘型	偏心芯鞘型	偏心芯鞘型	芯鞘型	芯鞘型
	捲縮ﾀｲﾌﾟ		螺旋型	螺旋型	螺旋型	螺旋型	螺旋型	螺旋型	ジグザグ型	ジグザグ型
	ﾃﾞﾆｰﾙ×ｶｯﾄ長		2d×10mm	2d×10mm	2d×5mm	2d×30mm	2d×5mm	2d×5mm	2d×38mm	2d×38mm
	目付(g/m²)		12	12	12	12	12	12	12	12
	ｳｪｯﾌﾞ形成法		ｴｱｰﾚｲﾄﾞ法	ｴｱｰﾚｲﾄﾞ法	ｴｱｰﾚｲﾄﾞ法	ｴｱｰﾚｲﾄﾞ法	ｴｱｰﾚｲﾄﾞ法	ｴｱｰﾚｲﾄﾞ法	ｶｰﾄﾞ法	ﾗﾝﾀﾞﾑｳｪｯﾊﾟｰ
	ランダム性(%)		55	58	52	51	56	57	31	37
複合化法			熱風加熱法	熱風加熱法	熱風加熱法	熱風加熱法	熱風加熱法	熱風加熱法	熱風加熱法	熱風加熱法
見かけ密度(g/cm³)			0.030	0.019	0.022	0.018	0.021	0.022	0.033	0.025
剪断強度			△	○	○	○	○	○	×	△
表面風合い			9	10	8	10	9	10	8	9
透過速度(秒)			6	5	4	7	4	4	15	16
にじみ性(%)			20	22	16	18	18	17	60	70
保液性(%)			40	39	40	35	40	42	70	67
逆戻り性(g)			1.0	1.3	0.8	1.1	1.2	1.1	2.4	1.8

PP: Polypropylene PE: Polyethylene (here thing of high density polyethylene)

[0069] In spite of the Ayr RAID nonwoven fabric and card nonwoven fabric of a staple fiber layer (B) belonging to this superintendent officer and constituting them compared with the compound-ized nonwoven fabric concerning the example of a comparison, the compound-ized nonwoven fabric applied to an example a passage clearer than the result of Table 1 has small apparent density gravity, is excellent in surface aesthetic property, and further excellent in shear strength, a transmission rate, blot nature, solution retention, reversion nature, and all random nature.

Therefore, while excelling in the shear stress expected when it is used as facing of absorptivity goods, or gestalt stability [as opposed to / get twisted and / stress], since apparent density gravity is low, the compound-ized nonwoven fabric concerning an example is excellent in surface aesthetic property, and the operation like a capillary tube, the longitudinal direction of a machine, i.e., direction, of a compound-ized nonwoven fabric, is low, and excellent at a transmission rate, blot nature, solution retention, and reversion nature harder [which is excellent in the operation like a capillary tube to the thickness direction of a compound-ized nonwoven fabric]. Namely, the compound-ized nonwoven fabric concerning this invention is making high random nature give the staple fiber nonwoven fabric (B) which the goodness of the difficult high shear strength and surface aesthetic property is reconciled in the conventional laminating nonwoven fabric, and is further used for compound-ization. The lowness of the penetrable goodness of body fluid, such as urine which is the property of a proper as facing of absorptivity goods, such as a disposable diaper and a sanitary napkin, sweat, and blood, spot permeability, a feeling of SARATTO, and the reversion nature of the transmitted body fluid is satisfied.

[0070] In addition, above, mainly although the case where the compound-ized nonwoven fabric concerning this invention used it as facing of absorptivity goods was explained, the compound-ized nonwoven fabric concerning this invention can be used suitable for a filter material besides being the clothes for an operation, a credit cloth, the base fabric of HAPPU material, etc., engineering-works materials, etc., as mentioned above.

[0071]

[Effect of the Invention] The compound-ized nonwoven fabric concerning this invention has the effectiveness taken below from the operation by the structure mentioned above.

(1) The random nature of the staple fiber nonwoven fabric (B) which constitutes a compound-ized nonwoven fabric is high, and since the staple fiber (B) which constitutes a staple fiber nonwoven fabric (B) has arranged in the thickness direction of a nonwoven fabric, excel in cushioning properties.

(2) Since the apparent density gravity of a compound-ized nonwoven fabric is low enough, when the aesthetic property of bulky and a front face is good and uses it as facing of absorptivity goods, excel in the touch.

(3) Since the operation like a capillary tube, the longitudinal direction of a machine, i.e., direction, of a compound-ized nonwoven fabric, cannot take place easily, when it is used as facing of absorptivity goods, excel in spot permeability.

(4) The operation like a capillary tube, the longitudinal direction of a machine, i.e., direction, of a compound-ized nonwoven fabric, is low, and since it excels in the operation like a capillary tube to the thickness direction of a compound-ized nonwoven fabric, when it is used as facing of absorptivity goods, excel in the permeability of body fluid.

(5) The apparent density gravity of a compound-ized nonwoven fabric is fully low, and since it excels in the operation like a capillary tube to the thickness direction of a nonwoven fabric, when it is used as facing of absorptivity goods, the reversion nature of the transmitted body fluid is low.

(6) Since the operation like a capillary tube, the longitudinal direction of a machine, i.e., direction, of a nonwoven fabric, cannot take place easily, solution retention is low, and when it is used as facing of absorptivity goods, excel in a feeling of SARATTO.

(7) Since the anchor effect between the layers of the joined staple fiber nonwoven fabric (A) and a staple fiber nonwoven fabric (B) is excellent, when it is used as facing of absorptivity goods, excel in shear stress and gestalt [as opposed to / get twisted and / stress] stability.

</SDO>

[Translation done.]

* NOTICES *

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is the expansion top view which looked at the compound-ized nonwoven fabric of this invention from the skin side of an example of the napkin for arrangement used for the part.
[Drawing 2] It is the outline end view of the cross section of a X-X'part of drawing 1 .
[Description of Notations]
1 Napkin for Arrangement
2 Top Sheet
3 Second Sheet
4 Backseat
5 Absorber
6 Sanitary Napkin Longitudinal Direction Edge
7 Absorber Straight Side Edge
8 Napkin Straight Side Flank for Arrangement
9 Wrapping Material
10 Absorber Straight Side Flank
11 Body Fluid Diffusion Layer
12 Glue Line
13 Release Liner

[Translation done.]

* NOTICES *

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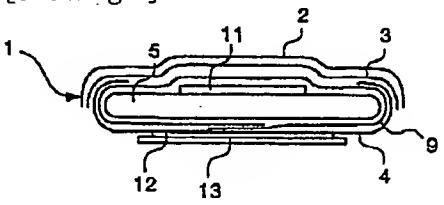
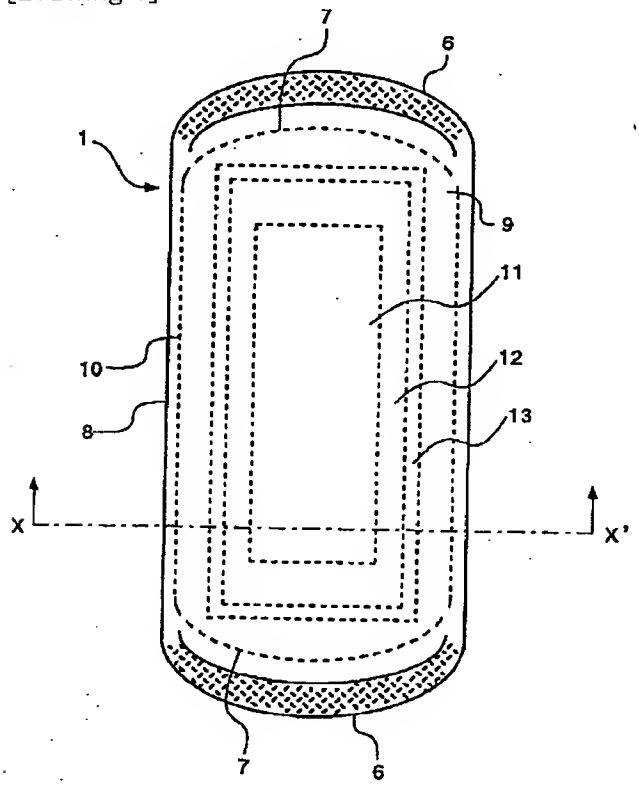
DRAWINGS

[Drawing 2]



[Drawing 1]



[Translation done.]